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SEVEN DOLLARS

CIO

THE MAGAZINE FOR INFO

SPECIAL SECTION

STRATEGIC OUTLOOK ON ENTERPRISE NETWORKS:

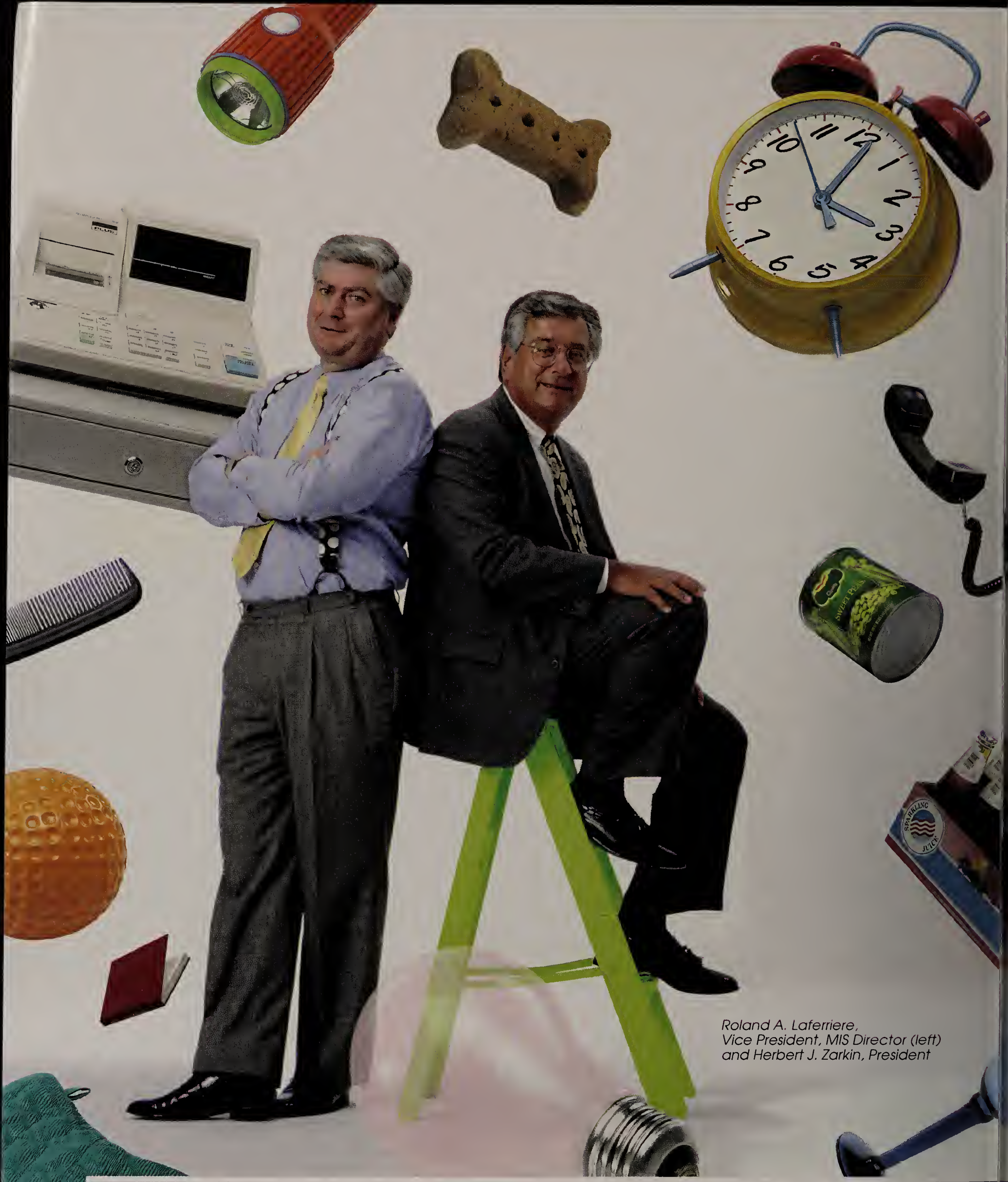
How To Complete The Connections

ALSO INSIDE:

Expert Advice On Legacy Systems

Ashland Oil Inc.'s
Gaige Paulsen

AN INTERNATIONAL DATA GROUP PUBLICATION



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Vice President, MIS Director (left)
and Herbert J. Zarkin, President

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CIO

VOLUME 6, NUMBER 12

STRATEGIC OUTLOOK ENTERPRISE NETWORKING

The Forces of Democracy 49

By opening up the flow of information, LANs can radically affect the power structures in an organization. And that has some people worried.

By Thomas Kiely

An Internal Technology Poll 54

Getting concrete figures on technology assets is trickier—and more critical—than ever.

By Thomas Kiely

Power to the people **49**
Cover photo by Jack Van Antwerp

Governing the Multiparty System 60

Supporting a range of computers and networks requires a multiplicity of management systems (and the technicians to operate them) and a great deal of resourcefulness. Still, there are often solid business reasons to enable and support IT diversity.

By Abbie Lundberg

A Democratic Reform Movement 66

Florida Power is using information technology to prepare for the trials of deregulation.

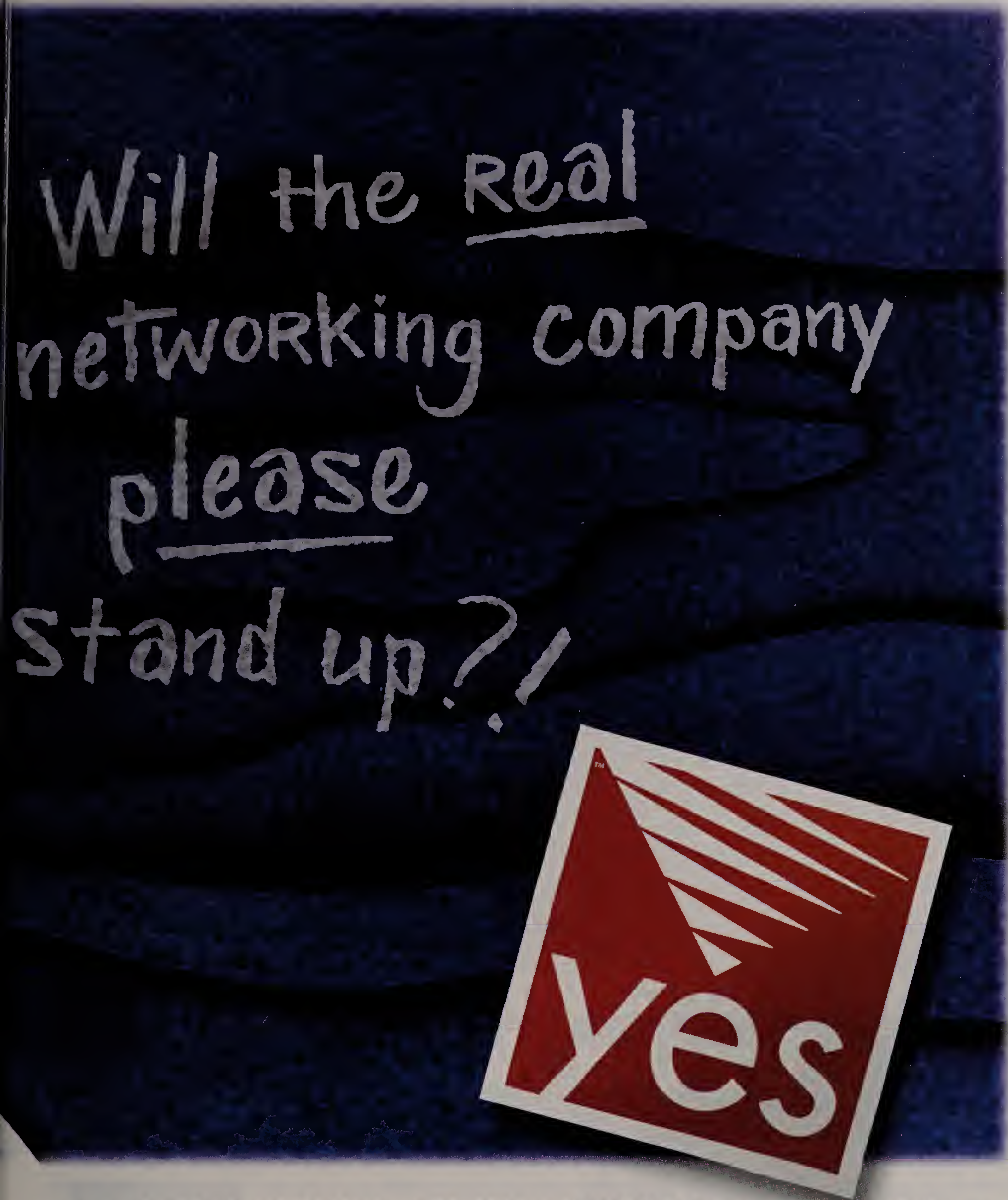
By Abbie Lundberg

Energizing end users **66**

Technology tracking **54**

MORE ▶▶▶

Just when you were beginning to understand the old definition of networking, there's a new one. In a world where lots of vendors have figured out how to network their own products, only Novell has spent the last ten years uniting products from different vendors into one seamless information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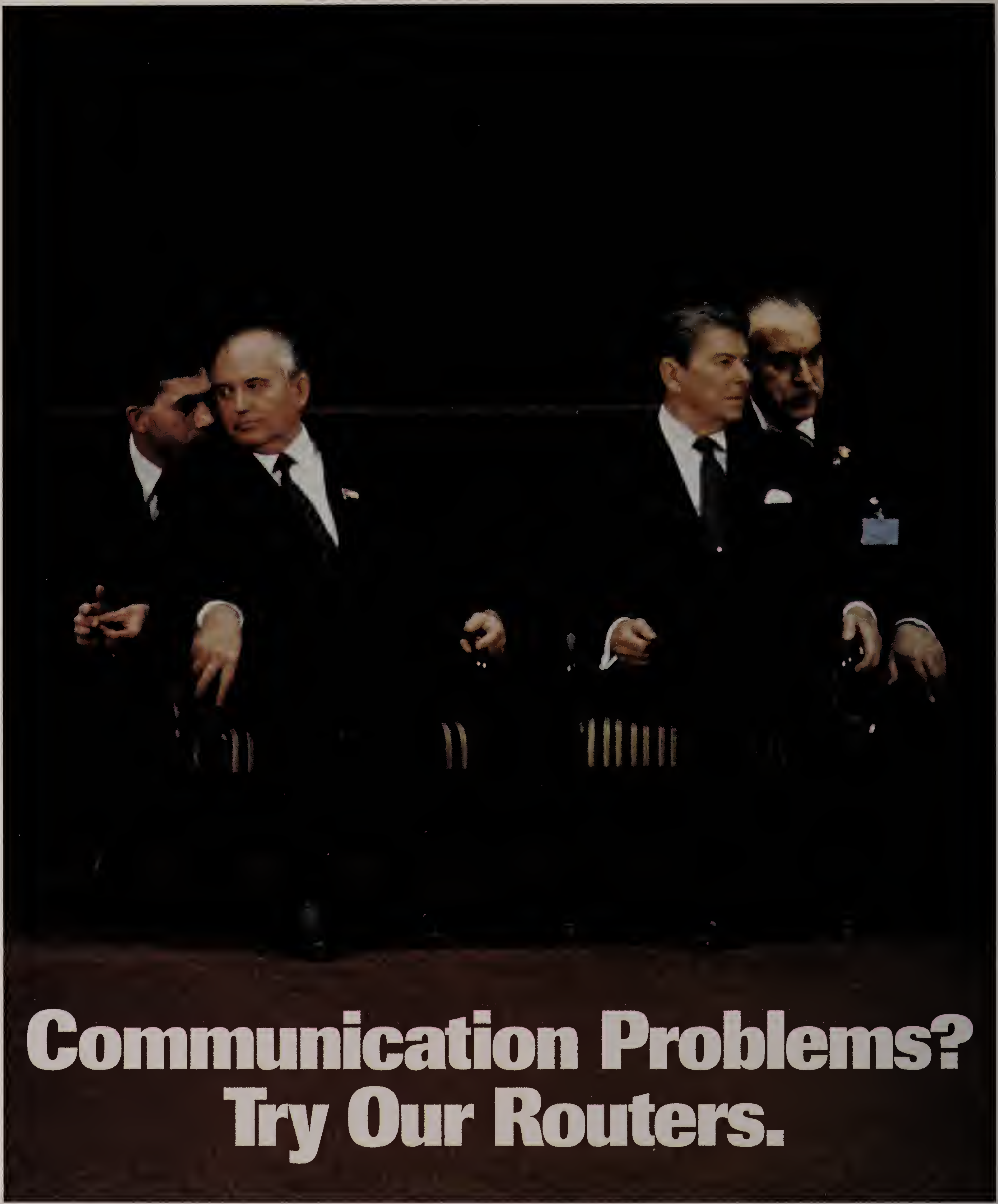
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CIO

FEATURES

Something Old, Something New 34

A new *CIO* series asks four experts to offer opinions and advice on common IS management problems as illustrated by real-life case studies. This month's panel grapples with the fate of outmoded legacy systems.

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The Sum of Its Parts 74

New cost-reporting methods give senior managers a more accurate and informative financial picture by examining the trees as well as the forest.

By Scott Wallace

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Smart companies treat the marketplace as a sea of individuals, each with his or her own specific needs and desires. Mass customization helps meet that multitude of demands.

By B. Joseph Pine II

STATE OF THE ART: LONG-DISTANCE LANS 82

Organizations can now provide LAN access to users working beyond the reach of the extended corporate network. With foresight, CIOs can meet user requirements while keeping costs down and maintaining network integrity and security.

By Lucie Juneau

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NOT A VALID ENTRY PLEASE PRESS POUND
BLAH... BLAH...

LETTER FROM THE EDITOR

PHOTO BY WEBB CHAPPELL

With an estimated 70 percent of PCs operating in a networked environment today, and with enterprises requiring speedier coordination among their various departments and business units, it is imperative that information executives devise and manage network strategies. Our Strategic Outlook this month presents a variety of views on how IS executives are approaching networking.

Many organizations are looking for a middle ground between enabling diversity and maintaining control. The more diverse a company's business, the less control it can wield, but this doesn't mean standards should be ignored, as Associate Editor Abbie Lundberg found in her article "Governing the Multiparty System," beginning on Page 66.

And what of the politics engendered by networking? Information sharing isn't at the top of everyone's list. Certain departments are highly possessive of their data, according to some major consulting firms. And middle managers, traditional information guardians and passers, aren't too keen on the concept either, reports Senior Writer Tom Kiely in his article "The Forces of Democracy," beginning on Page 50.

Creating an enterprise network was a primary driver at Florida Power, where proprietary systems were perceived as preventing the company from competing effectively in the increasingly deregulated utilities industry. So acute was the need for an open system that Florida Power was prepared to invest an additional $64 million (on top of its existing IS budget) to devise a new communications architecture. As the IS director there stated, "LANs...are too important to business operations for corporations to continue running them in an incohesive fashion."

This month *CIO* begins a new feature called "Second Opinions," which will run several times a year. (Please see "Something Old, Something New" on Page 34.) This forum presents a problem being encountered by an information executive and solutions suggested by a panel of experts. Our first problem centers on legacy systems—no stranger to many organizations. We think this format will be highly useful and informative to our readers. Please let us know what you think. If you have a particular problem you want addressed, please contact Senior Writer Richard Pastore at 508 935-4435.

Marcia Blumenthal

CIO

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Art and Design Director Mary Lester Marshall
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Contributing Writers Lucie Juneau, B. Joseph Pine II, Scott Wallace
Contributing Copy Editor Carol Zarrow

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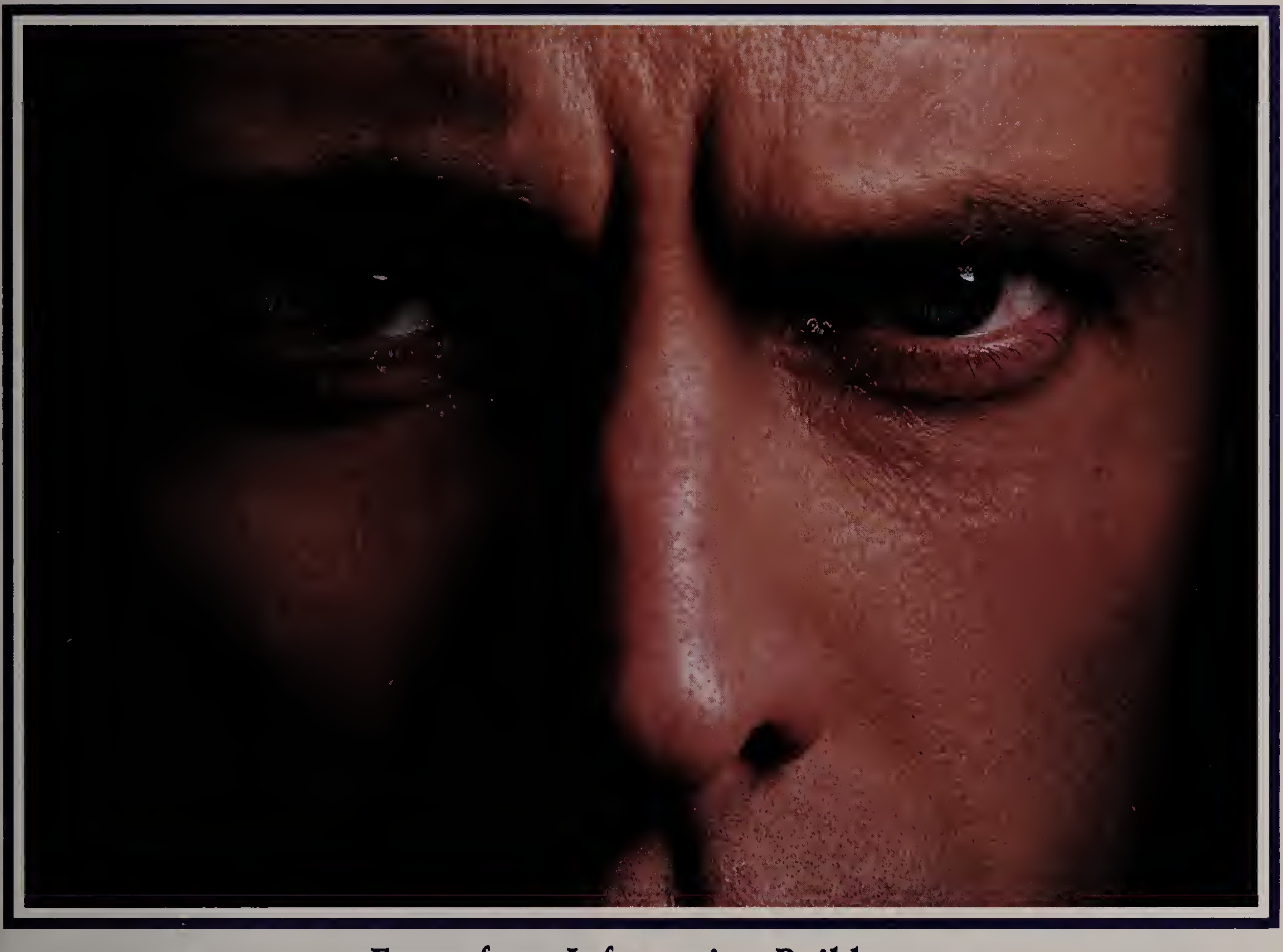

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It even tolerates

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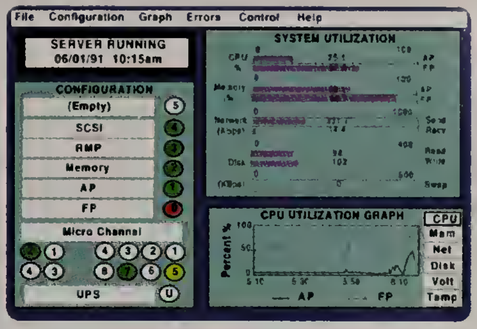

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The MASS/2 option has a user-friendly GUI that lets you distribute computing power across your organization from a central location.

Server 195/295 Comparison

Feature	Server 195	Server 295 Model 1	Server 295 Model 2
Remote Maintenance Processing and Modem	optional	standard	standard
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MASS/2	optional	standard	standard

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LETTER FROM THE PUBLISHER

PHOTO BY GEORGE SIMIAN

> *"Networking is fundamental to the way we will do business. LANs allow people to work and share information as if they were right next to each other, and that gives managers greater flexibility to reshape processes."*
>
> *–Larry Levitt*
> *Manager of Computer Services*
> *Pacific Gas Transmission*

Networking is more than "shared information." It enhances the relationship between business and customer. It provides real-time business information for managers. It links companies by EDI. It creates just-in-time schedules, strategic alliances and virtual meetings. Networking truly has the power to change the way organizations work.

But like any new technology, networking engenders fear and anxiety in end users and IS professionals. The Strategic Outlook section in this issue brings to light the challenges faced by a number of companies developing enterprisewide LANs, and some of their solutions. After reading through the case studies, it is up to you to take all the pieces of the networking puzzle and configure them to fit the needs of your company.

Whether your company maintains a diverse IT environment or adheres strictly to standards, you know that LANs are becoming a necessary tool in the workplace. As the technology continues to develop, it is essential that IS executives understand all the rewards that networking offers. If you can look beyond the "shared information" benefit, you will see a window of opportunity that will bring your company much success as it heads into the 21st century.

P.S. Mark your calendar—the next CIO Perspectives Conference, "The Politics of IT: Reordering The Enterprise," will take place on Oct. 17-20 at the Westin Mission Hills, Rancho Mirage, Calif. Please call our toll-free registration hot line at 800 366-0246.

Coming In CIO

Separation Anxiety

IS executives who have decided to go the outsourcing route have good cause for separation anxiety. Having determined to surrender control over a significant portion of their organizations' functional responsibilities, they will be looking for a high degree of certainty about factors such as performance, price, quality and delivery dates. An effective way to manage the risks is a thoroughly researched outsourcing contract.

Reinventing EDI

In manufacturing industries, the EDI leaders of yesterday are transcending EDI today. It's not so much that EDI is being replaced by other technologies. Rather, the very processes that EDI enabled are being eliminated, and new ways of conducting business—such as "quick response," "dynamic inventory replenishment" and "schedule sharing"—are taking their place. Analysts even have a buzzword for the post-EDI phenomenon: electronic commerce.

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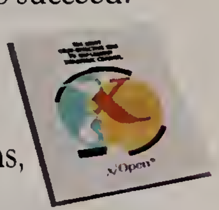

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TECHNOLOGY DEMONSTRATIONS

A MULTIMEDIA CIRCUS

You're an information executive who's been turned on to the possibilities of working interactive multimedia into your company's IT mix. You've scanned reams of copy about optical technology, interactive systems and remote transmission and archiving of data. You've talked to numerous vendors, all of whom have been delighted to set up a product demonstration for you. At this point, though, you're having trouble telling the vendors and their products apart, and the only conclusions you've been able to reach are truly unnerving: You *still* don't know enough to make an informed decision, and an uninformed decision could result in financial disaster. Does anybody out there care?

Jacqueline Hess does. As director of the National Demonstration Laboratory (NDL) for Interactive Information Technology in Washington, she's seen many visitors from the business community—some merely curious, some actively seeking help—in the year since the laboratory was installed in the atrium of the James Madison Memorial Building of the Library of Congress. Right now, she says, the world of interactive multimedia is a real Wild West. In the midst of its "creative chaos"—where few if any standards for equipment, software and connections exist—potential users are right to feel they're not in control.

Every day, about 100 people visit the NDL. About one-fourth are there for business concerns: Some are producers of multimedia training materials, others are potential users of interactive multimedia, and still others are consultants researching the subject for clients. Despite their varied backgrounds, Hess says, they have a common fear: They're trying to make choices about interactive multimedia, and they're afraid they'll make an investment in a product that will turn out to be another Betamax—a dead end.

Like the library that sur-

PLEASE DO NOT OPERATE UNASSISTED

VISITORS TO THE *National Demonstration Laboratory try their hands at creating their own multimedia presentations.*

PHOTOS BY JIM HIGGINS/LIBRARY OF CONGRESS

SAY "SALOME" TO THE SAPSUCKER IN MY ACTUARY

They say that if you want to get ahead in this world, it's not what you know that matters but whom you know.

Today's MBAs had better hope that they're right.

***Harper's* magazine recently reprinted the partial results of a study of "cultural literacy" among first-year graduate students at Wake Forest University's Babcock Graduate School of Management. (The study first appeared in *Business Horizons*, published at the Indiana University School of Business.)**

Asked for the meanings of 250 terms taken from E.D. Hirsch's *Dictionary of Cultural Literacy*, the students were able to correctly define only 17.2 percent. Below are a few of their responses.

ACROPHOBIA: fear of acronyms
ACTUARY: a home for birds
ANNUNCIATION: to speak clearly
AARON BURR: Perry Mason
CELLULOSE: fat deposits
DUODENUM: a number system in base two
GERRYMANDER: to speak at length in Congress to keep a bill from passing
JEHOVAH: Jesus
RAMADAN: Jewish holiday
SALOME: "hello" in Hebrew
1066: an IRS form
STRADIVARIUS: as in "Rex"
XYLEM: as in "insane" ■

TAKE THIS JOB AND SEARCH IT

If the trend of short CIO tenures continues, IS executives and their technically proficient brethren will be happy to know that they can apply their computer skills to finding a new position.

JobHunt, from Scope International of Charlotte, N.C., is an integrated software package that includes a data bank of current addresses, phone and fax numbers for 5,000 medium size to large U.S. companies, which users can search by region, job function or S.I.C. code. The product slices hours or days off of the time many people spend at the library building employer databases.

JobHunt also offers text-editor and mail-merge features; the latter allows users to print out hundreds of personalized resumes, cover and follow-up letters at a single sitting. A built-in telephone dialer will automatically dial companies' numbers to facilitate follow-up calls. ■

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"The ARDIS Network has allowed us to be much more responsive to our customers' needs, and that provides us with a competitive advantage."
– John Cosentino,
President, Otis Elevator
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rounds it, the NDL is a clearinghouse for information. But it's also a demonstration facility, "an electronic playhouse," as some have called it. Here, twice a day, five days a week, Hess and her staff—one other full-time employee and a number of volunteer interns—take groups on two-hour tours. Participants are invited to handle some of the laboratory's several hundred interactive video and computer learning and presentation systems, which are available at 29 workstations. These include a virtual-reality system that transports the user into an interactive video environment. More modest setups require only a laser-disk player plus a television or audiovisual monitor.

Apart from its being fun, the point of the hands-on approach is to demystify the technology and help visitors realize that they can develop personal, common-sense evaluative criteria, even in the absence of industrywide standards. Ultimately, Hess hopes, the NDL will have significant input into the creation of standards.

The multimedia "toys" in the NDL playhouse are all loans or donations from industry vendors. The laboratory is a wonderful marketing agent, Hess says: Companies get a public tryout of their products and feedback from users. The NDL's policy is one of strict neutrality, however. A nonprofit agency, its role is that of facilitator, not marketer.

Similarly, the Atrium Group, a consortium that funds the NDL through its dues, subscribes to a hands-off philosophy. The group's present membership is drawn from the top executive levels of 19 computer and technology corporations (among them, Microsoft, GTE, IBM, Nynex Computer Services and Pioneer Communications). The inducement for companies to join, according to Hess, is the knowledge that they will gain visibility and access to the process of public policy-making through their participation. She is quick to add, however, that the Atrium Group is not a lobbying organization but simply a forum for the discussion of technology issues and the formulation of policy recommendations.

"Policy-makers know that once an issue has been debated at length by the competitors within an industry, the resulting conclusions tend to represent positions of compromise with which the major players are comfortable. I expect the Atrium Group to present workable proposals based on real-life experience."

Asked if she sees any standards emerging, Hess replied that the multimedia market has to become much more mature before standards can be developed. In the meantime, she would like to see more places like the NDL, where technology gets a human spin and where people can go to play—and learn.

NOT A VALID ENTRY PLEASE PRESS POUND
BLAH...
HA BLAH

ILLUSTRATION BY FRAN O'NEILL

ESCAPE FROM VOICE-MAIL HELL

RING-RING.

"Hello, this is Frustrato & Company. If you know the extension of the party you wish to reach, press one now. If not, press two."

2

"Please enter the letters of the last name of the party you wish to reach, followed by the pound key."

MARFIN #

"That is not a valid entry. Please try again."

MARTIN #

"Please hold.... Martin.... does not answer. Press star if you wish to leave a message for this person. Or press pound for more options."

*****

"Sorry, that mailbox is full. To exit, press zero followed by the pound key."

0 #

"Hello, you've reached Frustrato & Company. If you know the extension of the party you wish to reach, press one now. If not, press two."

UP YOURS

"That is not a valid entry. Please try again."

If you're sick of conversations like this, follow the lead of Sidney Werlin, a retired salesman from Belmont, Mass. Fed up with infuriating voice-mail loops, Werlin wrote and filed a bill before the Massachusetts legislature that would require organizations in the state with more than 25 employees to provide direct telephone access to a human operator. One of the worst local voice-mail offenders is the Massachusetts Bay Transit Authority, which forces callers to spend two minutes jumping through phone-mail hoops just to check the bus schedule.

ELECTRONIC SUPPORT GROUPS

Technology has improved everything from the instruments surgeons use to the way administrators manage hospitals. Now GEnie, an online information service headquartered in Rockville, Md., is addressing the emotional as well as the physical and organizational sides of health care.

The service has established an online support group for AIDS patients and HIV-positive people who are not sufficiently mobile to participate in community- or hospital-based gatherings. Through the GEnie CHAT line, AIDS sufferers can communicate with others experiencing the same difficulties and fears. Members share information about treatments and the latest medical research, discuss personal issues and offer support.

GEnie also offers what it calls an "electronic town hall" for persons with a wide variety of physical handicaps. The disABILITIES RoundTable disseminates information on issues ranging from interpretations of the Americans with Disabilities Act to how to prepare for earthquakes and natural disasters. System Operator Mari Shepard is an expert on resources for the disabled and has electronically compiled information on rights, resources and policies.

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IS People

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In our bonus article, Dr. Michael Hammer argues in favor of reengineering far beyond the confines of the IS organization. He advocates reshaping the entire enterprise. The interview begins on page 4.

Merrill Lynch's Howard Sorgen Views the IS Direction

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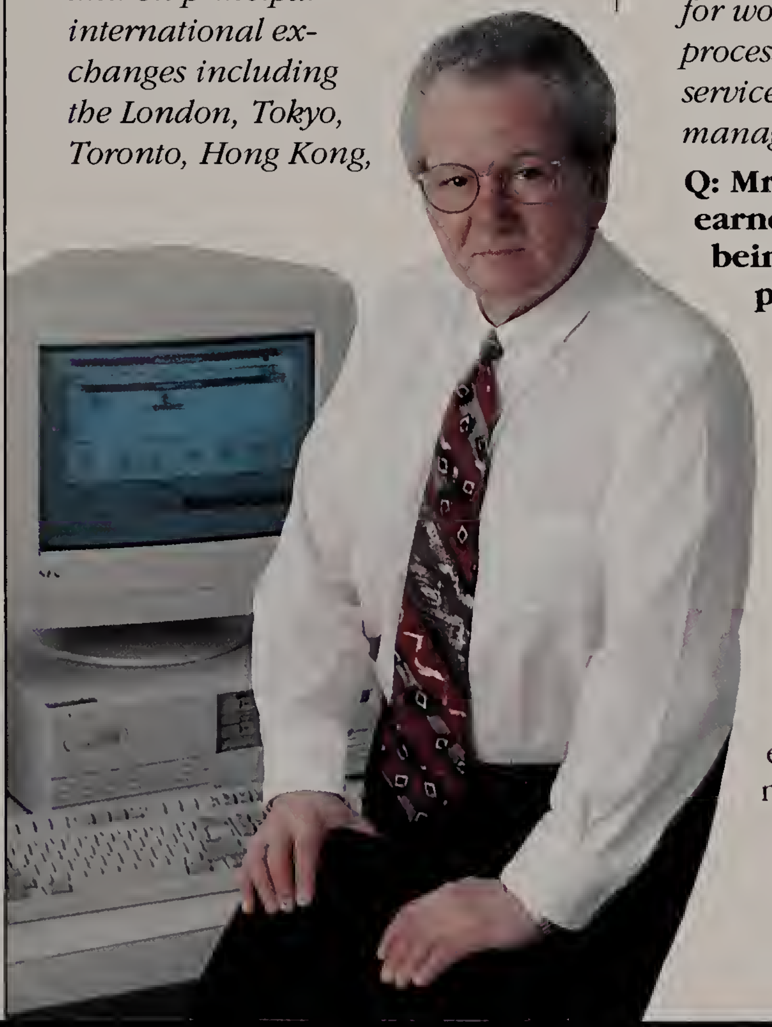
Over 12,700 financial consultants provide services for more than four million households and small enterprises through 500 offices worldwide with client assets in accounts totaling nearly $500 billion.

To better understand the business mission of Merrill and to accurately assess the role of IS within the enterprise, IS People put the questions we had to Howard P. Sorgen, senior vice president for global information services. Sorgen has overall responsibility for worldwide information processing, telecommunications services, and applications management.



Q: Mr. Sorgen, Merrill has earned a reputation for being very aggressive in pursuing new technology and IS business ventures. What have been the rewards? Are there any regrets?

A: The easy answer is to look at our balance sheet. The creation and delivery of innovative products to our customers has required us to be constantly on the leading edge of technology. This means we're always looking to partner with suppliers of new and innovative technology. We were among the first to exploit image technology to capture critical information from a security instrument and use the data captured as the basis of our work flow, rather than continue to move the original stock or bond around. Our CMA (Cash Management Account), which was introduced in the 1970s, combined a traditional brokerage account with a credit card and checking capabilities. This required the ability to deploy technology to maintain these accounts, and to create integrated customer statements using state-of-the-art printing capabilities. The rewards are our thousands of satisfied customers, as well as our 1992 financial results. I don't think we have many regrets.

Q: How important is the IS organization to the business mission at Merrill?

A: IS is essential to the business mission at Merrill. We are really in the information business. We provide traders and brokers with up-to-date information on the markets, as well as the analytical tools they need to do the financial engineering necessary to create new products like "derivative instruments." We must furnish them with the latest information technology. In our marketplace, the firm that can perform the calculations and put together the deal first gets the business. This led us into massively parallel processing and distributed information delivery, well in advance of many of our competitors.

Q: How is your IS organization structured?

A: We try to blend the best elements of centralized and decentralized management. We recognize that application developers need to stay very close to the business; so our development organizations are closely aligned to the business areas they support. But at the same time, we respect the special nature of the systems discipline; so the systems organizations report into a central IS organization. This allows us to closely control the systems planning and budgeting process and to ensure that we have appropriate career planning and educational programs in place to maintain the critical skills of our systems professionals.

Q: In terms of the IS mission, what role does "quality" play? How do you plan, measure and adjust to meet quality objectives?

A: We have formal quality programs. We also use the techniques available from the "quality movement" to focus on particular problems and to improve our business and operational processes. We go a bit further though, in that we view quality as a critical part of everything we do. It is implicit in every action taken by each IS employee, from the computer operator to the network engineer. Quality is incorporated into all of our planning and into our measurement and monitoring systems.

Q: How important, within your overall quality objectives, are the terms "availability" and "service delivery"?

A: Both of these are critical components of our central service provision organizations, such as Global Telecommunications and Information Processing (our data center management arm). Availability of our mainframe and telecommunications "plants" is monitored constantly, against very demanding service level objectives. We also hold a rigorous expectation of those areas that provide service delivery, from LAN design to telephone moves, adds, and changes. We are in the process of extending these concepts to our distributed computing platforms, both UNIX and PC-based. Our clients in the application development and business areas are looking to us to support their distributed computing platforms as professionally as we have handled their mainframe and central telecommunications needs.

Q: How difficult is it to find and retain the best technical people who understand and carry out your business mission?

A: I think we are particularly fortunate in this area. Our firm's reputation has allowed us to attract some of the best technical people in the industry. Most of our senior technical professionals and managers have more than fifteen years of technical experience in the financial services industry. So they know both the business side and the technology side. We continually invest in their training, and we compensate them well. This has led to very low turnover, and has provided us with a pool of talent second to none.

Q: When you speak to your management team, what is your primary message?

A: I would have to say that my major emphasis is on teamwork. My management team knows they are expected to "partner" with each other and with our clients. I empower my managers to make the major decisions in their areas. We also work together to provide high quality and cost-effective services to our clients. By the way, we also have a fair amount of fun in the process.

Q: It seems these days that many American businesses focus only on short-term objectives without much in the way of planning beyond a year or two. European and Japanese business leaders tend to plan much further out. Are we being short sighted and if so, what should be done to change the way we conduct business planning?

A: I think to be successful you really need a balance between short- and long-term planning. Much long-term planning in IS is obsolete almost before the ink on the plan is dry. We've recently introduced a systems planning process that focuses on the initial business justification for major projects and then calls them back in as they get closer to implementation. Part of this process consists of bringing in our best technical and operations managers as a "strategic planning group" to assist in both assessing the impact of new development projects on our "plant" and in eliminating duplication. As we focus on this tactical or near-term plan, we are concurrently working to build a slightly longer strategic systems plan with a two- to three-year time horizon. I really don't think this is being short sighted. I think it's a realistic adaptation of planning for the realities of the changing environment of the '90s.

Q: The '70s and early '80s were halcyon days for banking and financial firms. But they were followed by a catastrophe for which we will end up paying. Without pointing a finger of blame, what lessons have we learned?

A: "Catastrophe" seems too strong a word. Banks and brokerage firms did tend to overindulge a bit in the '70s, and particularly in the '80s. But the marketplace provided the necessary correction, as can be seen by the mergers of MHT and Chemical, and of Bank of America and Security Pacific. I admit that the S&L crisis creates the impression of widespread dysfunction, but I think the worst is behind us. If we learned anything from this, it is the need to manage risk more carefully and to provide knowledge-based supervision more closely. I think senior managers need to be more "hands on."

Q: A growing number of young people in the U.S. don't finish high school. Of those who do, there is little in their educational background that prepares them for a fast-paced job in IS or any technical industry. What can be done to identify and rescue some of those good minds going to waste?

A: I think we need to reach directly into the schools and work with young people while they are in the education process. One of our senior technology managers is participating in a program at the local high school, working with students in using the latest distributed computing technology. We need to do more of this. We need to increase our summer intern programs to give such young people exposure and experience in the business world.

Q: Is it in our best interest for IS people to become more involved in our schools?

A: I think IS people have a lot to offer in this area. IS people tend to be drawn from a wide variety of backgrounds. We have people with liberal arts, humanities, and scientific educations. They could serve as role models for students and as mentors to them. We have only recently begun to scratch the surface on this.

Q: Reducing staff and working "smarter" has become very popular with a lot of companies. It has changed the traditional role of middle management and how we staff. Has rightsizing/downsizing helped companies to cut waste and overhead or is it a shortsighted approach as we begin to recover from our economic slowdown? How does downsizing affect IS productivity?

A: The downsizing movement has served an important purpose. For too long, American corporate managers had not focused on the cost side of the equation in their pursuit of profits. As more firms chase fewer customers and revenues, the necessity of streamlining our staffs and expense structures has become obvious. "Downsizing," while painful and dislocating for many, was a necessary exercise. While we may have lost some talented people in these exercises, by and large our most able employees have stayed behind. While I think economic recovery will somewhat ease the pressure to continue staff reduction, the lessons we learned in the last few years will remain with us. IS must continue to refine and perfect the deployment of optimal technology at the least cost; and quality must not be allowed to suffer.

Q: A final question, from your vantage point, how aggressively do you apply emerging technology?

A: I think the major challenge to IS is to stay slightly behind the technology curve but always a little ahead of the cost curve. What I mean by this is that we really don't have the luxury to latch onto each technology fad; we need to wait and see – but not too long. We must also constantly focus on refining our cost structure – continually attacking duplication and waste, and constantly substituting technology for labor, where appropriate.

Prior to joining Merrill Lynch, Sorgen spent 27 years with Manufacturers Hanover Corporation where he served as executive vice president and director of MIS. Active in the financial arena, he has chaired numerous committees and organizations within the financial services sector and is a frequent speaker at various information services forums. Sorgen was educated at New York University; he and his wife are parents of three daughters and reside on Long Island, New York. ■

Michael Hammer Envisions a Totally Reengineered Corporation

Dr. Michael Hammer is arguably the preeminent authority on the value and management of new Information technologies (IT) and their implications for emerging business strategies. Hammer became an M.I.T. professor of computer science, an internationally recognized business consultant, and a visionary of the impending information revolution that is driving the radical change of the modern corporation.

Hammer's controversial vision of business and the role of IS in the next century is most unsettling. He isn't talking about CASE technology, renewing base COBOL code, or OOP emergence. He is advocating a more radical change – a total reengineering of the entire corporate model. If he is correct, his ideas will rock the very foundations of virtually every aspect of the traditional organization, from the structure of its departments (including MIS) to the very definition of company strategies, products, and services. Reengineering of the corporation is not a luxury, Hammer believes that it is a matter of survival.

Q: Dr. Hammer, you are a proponent of major changes to the organization as we know it today. What new values will the changed organizations need to instill in order to prosper?

A: Over the long run, the most critical issue in an organization's success is its capacity for learning. While excellent performance of any particular processes may be important in the short run, in the long run, no matter how well any processes are performing, they will eventually require change. There are, in fact, some ethical values which organizations will need to acquire in order to be oriented toward change and learning.

Q: What ethical values do you feel are missing from current corporate thinking?

A: Ironically, the ones I feel are missing are often spoken of during company meetings, stressed by corporate policies, placed on the department walls as high-level corporate values, but are rarely practiced.

- *Humility.* Arrogance and complacency are the enemies of the corporation. So humility is important; the belief that no matter how good one is, one is not nearly good enough.
- *Honesty.* A passion for truth and an unwillingness to hide behind excuses or false fronts.
- *Healthy disagreement.* A respect for divergent points of view – more, an eagerness for divergence. In an organization where everyone is looking and moving in the same direction, no one sees the competition or unanticipated business setback coming from the flank or rear.

Q: Sometimes the "enemy" is within the organization. How does the manager of a reengineered organization deal with individual acts of incompetence, intransigence, or even sabotage?

A: Let me restate your question slightly before responding: How does a reengineered organization deal with the issue of control? The answer is, it does not abandon control. The reengineered organization takes a cost-benefit approach to control, as it does to anything else. What is the value provided by control? What are the costs associated with the failure of control? A lot of organizations spend more time, energy, and money avoiding problems than they would have to spend cleaning up the problems. We move from an orientation toward preventing difficulties to recognizing difficulties early on, and designing processes to make it easier to recover from such difficulties.

Q: As employees are freed from the confines of the traditional business hierarchy, how do managers handle compensation for productivity?

A: We shift from an evaluation on performing or failing to perform tasks, to an evaluation of results. It isn't task productivity (how many pieces of paper can you handle?); rather it's a "result measure" (what is the level of customer satisfaction). The organization changes from measuring individual performance to a team measurement. We also foster an environment of multiple sources of evaluation. In the traditional structure, the only source of evaluation came from the boss. Now it needs to come from the customer, coworkers, subordinates, as well as from the workers. Now my manager's job is not so much to perform the evaluation, but to synthesize these many evaluations into a coherent picture. It's a much harder job. Which is why one of the consequences of this process is that managing becomes a much more difficult job than it is today. It's no longer a routine activity; it becomes a true profession, requiring intuition, judgment, and wisdom. It's a good thing we'll need far fewer managers as the transformation takes place.

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Q: You mention customers as part of the performance input process. What about the problem of customers who insist on always being right?

A: The cliche misses an important point. There's a significant distinction between what customers really need verses what they say they want. Business customers are always right, although they may not always know what they need. Customer needs are shaped by the vendor's perception of what is possible. The real goal in serving the customer is to understand the customer's needs – perhaps better than the customer does. Successful organizations have the resources and energy to propose new solutions and allow customers to react to them. In IS, we know all too well examples of vendors who used to be leaders but fell behind when competitors were able to offer more responsive solutions to customer needs.

Q: On the process of "transforming the organization," what is the major hidden organizational obstacle to business reengineering?

A: The compensation policies of some organizations are often unspoken obstacles. I'm thinking about policies that are often structured to prevent people from doing things, either because their performance is narrowly tied to meaningless, short-term functional activities, or the risk-reward profile is such that it doesn't encourage them to want to try anything new.

Q: How does the outsourcing of IS functions affect the evolution to the reengineered company?

A: It complicates the process by raising the risk of "throwing out the baby with the bath water," the "baby" being the capacity for reengineering, the "bath water" being commodity-like IS activities. In their rush to outsource, I'm afraid that some organizations are outsourcing not just routine activities that can be appropriately handled on a third-party basis, but also their body of technical insight.

Then, when companies undertake strategic IS reengineering projects, they will lack the necessary IS skills, insight, and technical capabilities within their organizations to be successful.

Q: Business reengineering, like any radical reorganization of a company, will inevitably produce some chaos. Should companies try to avoid the ensuing chaos if possible?

A: No. We can't stand in the way of reengineering efforts even though they cause confusion and disruption. But we should respect and manage the climate of confusion to the extent possible. If we don't recognize the stage of chaos, don't have a healthy concern for it, and ignore it, it can sink us.

Q: In thinking about the transformed organization, have you had to rethink some dogma?

A: Yes I have. Let me cite just one concept that I've had to throw away. My revised belief is that the "soft stuff" is really the hard stuff. I used to believe that, in organizational change, issues such as human resources were fluffy and insubstantial, an afterthought. The only things that I believed really mattered were technology and hard design.

I've learned that what I considered hard or difficult is, in fact, the "easy stuff." The technology issues are the easiest to deal with and don't usually make the most difference. It took some doing for me to get over that belief.

Q: What books are you reading these days?

A: (Hammer doesn't answer. Instead, he pulls two books from his overflowing careworn, leather briefcase and shows the front cover of each. They are: *Improving Performance: How to Manage the White Space on the Organization Chart* by Geary A. Rummler and Alan P. Brache (Jossey-Bass), and *Modern Times* by Paul Johnson.)

"Successful organizations have the resources and energy to propose new solutions and allow customers to react to them."
– Dr. Michael Hammer

Q: No surprises about the first book. But why the history text?

A: I learn a great deal from reading history. If we can understand how the present evolved from the past, it may help us understand how the future may evolve from the present. I do not believe that "Past is prologue," despite what Shakespeare said. I don't think the past tells us anything about the future. But it is the historic, evolutionary processes that have some recurrence.

Q: Business is full of catchy phrases that don't always convey the real hidden agenda. Do you have a favorite?

A: "Rightsizing" comes to mind. It's often a code word for the wholesale slaughter of staff, a clean word with bloody, awful consequences.

Q: How will your work will be remembered fifty years from now?

A: In fifty years, I hope that we will be in places that are difficult for us to even envision today. To the extent that my work is remembered, I hope it will be as aiding in an important transition. It is like asking, would you say today that James Watt's steam engine was an important development? It's obsolete. No one uses it today. What was important about it is not its long-standing nature, but its value in an engineering transition. I don't have the temerity to believe that what I do today will have a great deal of relevance 50 years from now. To the extent it is remembered, I hope it would be as something that helped us get unstuck from a movement that had reached the end of its utility and helped start another movement which, I suspect, 50 years from now will also have reached the end of its utility and will be replaced by something new.

Hammer grew up in Maryland, the son of immigrant parents. He attended MIT, receiving a bachelor's degree in mathematics, a master's degree in electrical engineering, and a doctorate in computer science. While teaching at MIT for a number of years, Dr. Hammer led pioneering research efforts in database management, office automation, and electronic publishing systems. He currently heads Hammer and Company, a consultancy firm in Boston which offers a range of research and consulting services. Hammer lives outside Boston with his wife and four children. ■

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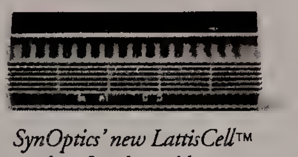

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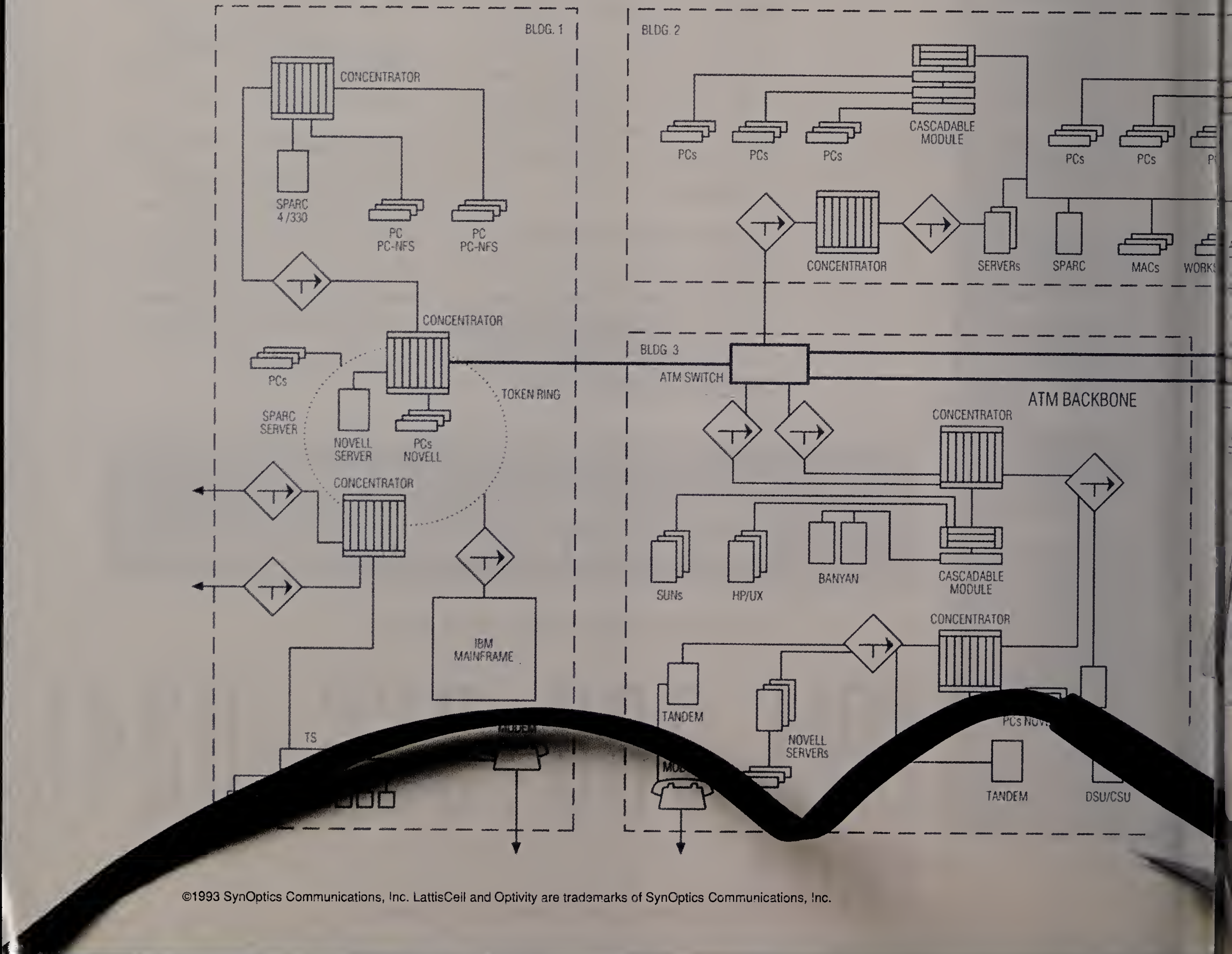

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A Temporary Convenience

Nothing lasts forever, including some jobs. While companies may need someone to sit at the front desk while the regular receptionist is on sick leave, other temporary jobs—including many requiring specialized skills—can be accomplished just as easily from the home. Telecommunications offers organizations broad access to qualified short-term employees, regardless of where the work is.

"There are a lot of different subsectors in this move," said Torrey Byles, manager of the Electronic Commerce Program for Input, a market-research firm in Mountain View, Calif. Consultants and freelancers are perhaps the most-established group of temporary telecommuters, setting their own hours and working out of their homes or offices on a project-by-project basis for companies across the country. Overseas contract programmers make up another growing category: They can be called on to develop computer systems quickly and cheaply, saving the organization benefits and training costs in the process.

The use of seasonal temporary telecommuters is also gaining in popularity. This is particularly true among companies that set up permanent, but not always fully staffed, remote work centers in areas where real estate and labor are cheap and plentiful.

While the use of remote short-term workers is growing, it is not likely to catch on soon among businesses needing less-specialized temporary office help, according to Bruce Steinberg, a spokesperson for the National Association of Temporary Services in Falls Church, Va. With roughly 15,000 temporary-help agencies operating across the country, such workers are readily available for work anywhere.

Nor is the use of temporary telecommuters without its problems. Because there is no one around to watch over them, these workers can sometimes pose a security risk. It was for this reason that, several years ago, the Internal Revenue Service rejected the idea of using temporary home workers to help process tax returns electronically during peak season. In addition, companies that rely on temporary labor pools for high-turnover jobs may be reluctant to entrust such sensitive information as credit card numbers to employees who could be out the door next week. ■

ILLUSTRATION BY JAMES KACZMAN

A Rosy Prognosis

With the president and first lady blaming health-care costs for destabilizing America's economy, these are tough times in which to practice medicine, run a hospital or manage a pharmaceutical company.

But if you manage a health-care IS department, smile—your peers think things are looking up.

Of the 571 attendees surveyed at the annual Health Information and Management Systems Society conference in March, 79 percent said they believe the Clinton administration's proposed managed-competition formula will accelerate the advancement of information technology in health care.

Attendees also perceived the drive to cut costs as a boon to computerization. Sixty-three percent said government and consumer pressure to control costs was the most important force driving increased computerization in health-care facilities. The growing need to link to outside facilities such as clinics and HMOs was a distant second, cited as most important by only 16 percent of respondents. ■

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We've all heard plenty about the advantages of CD-ROMs—their small size and enormous storage capacity. But what really makes the little devils so exciting is the wonderland of software currently available from enterprising firms like Wayzata Technology Inc., in Grand Rapids, Minn.

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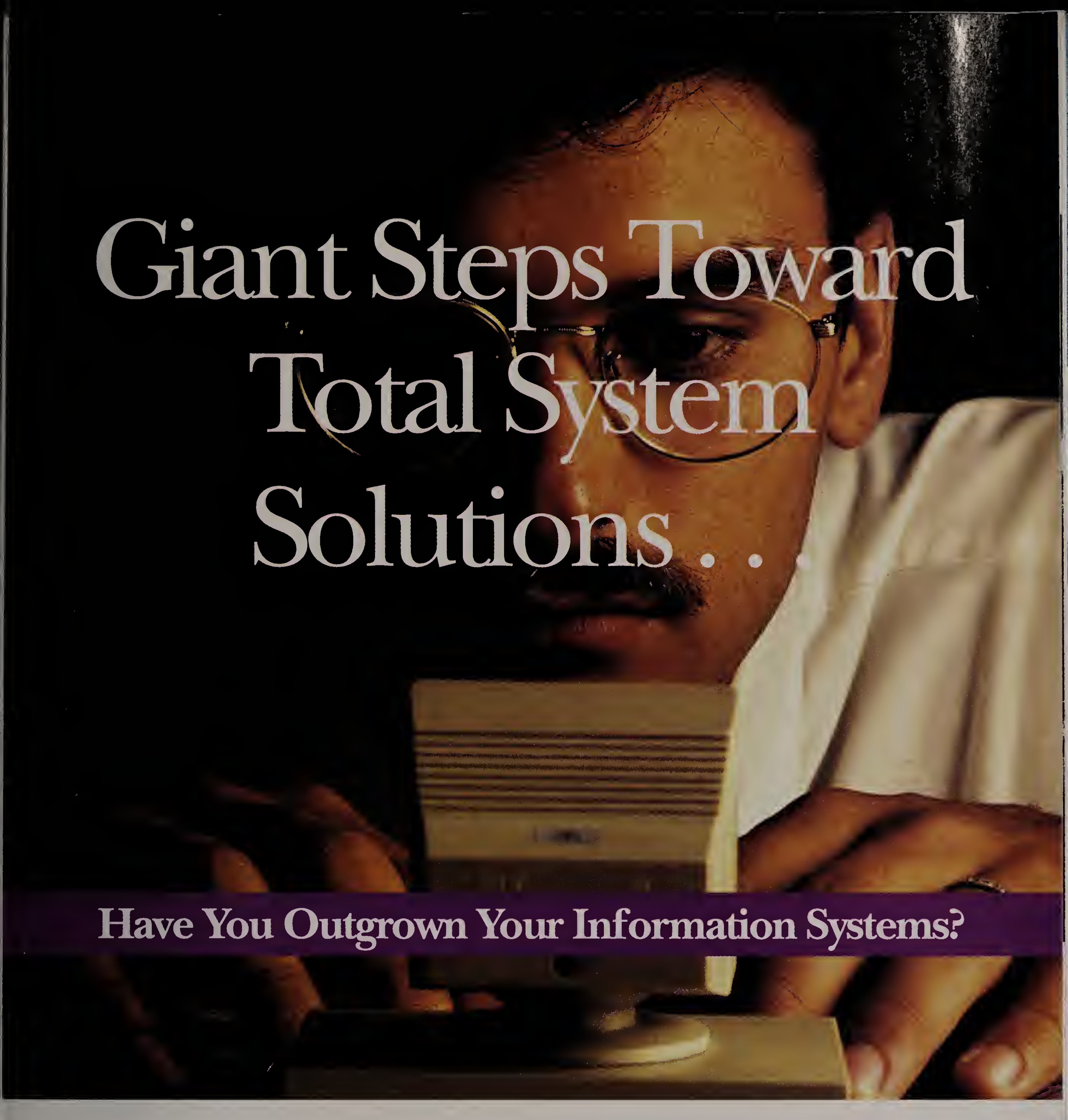
- **"Winning Elections" promises to answer questions about "why politicians do the things they do on the campaign trail." No indication whether Donna Rice or Ross Perot's daughter are mentioned.**
- **"People Doing Things:" The title says it all.** ■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IT AND MARKETING

HOISTING YOUR SALES

Collecting data is one thing. Putting it to effective—and profitable—use to support sales, marketing and customer service is quite another. Applying information technology to accomplish this goal was the major topic of the Seventh Annual Strategic Issues Conference, sponsored by Decision Support Technology (DST) of Cambridge, Mass.

Consultant Portia Isaacson set the tone with a keynote address on the opportunities that await IT visionaries. She mentioned groupware, workflow management and calendaring as future applications that will enable "frontline" sales and marketing. The year 2003, Isaacson predicted, will mark the age of ubiquitous, mobile computing that will bring about the "reparadigming" of the enterprise.

Subsequent speakers offered case studies and provided practical advice on how some organizations are creating effective, customer-focused sales and marketing departments. Harvard Business School Professor Thomas O. Jones discussed what sets a "breakthrough" organization, such as Southwest Airlines or Taco Bell, apart from the pack, pointing out that market research, product development and customer service are totally linked at such companies. "Customer service is not a clean-up process," he said. "It's a way to have direct contact with a customer."

In getting to know their customers, Jones continued, companies have a golden marketing opportunity, which often goes unexploited. Marketers should concentrate less on collecting demographic data and more on behavioral data as it pertains to specific purchasing habits. "Customer-information systems can be an important part of the breakthrough strategy," he concluded.

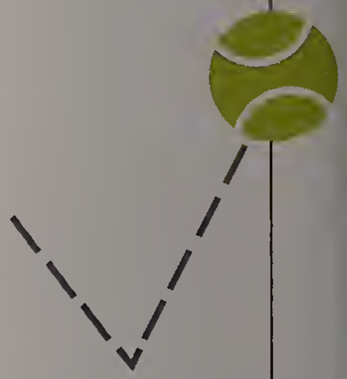
Richard Kravchuk, of The Dannon Co., discussed his organization's efforts to build partnerships with consumers and customers by developing tactical and strategic information systems. In order to be successful in the "partnership era," Kravchuk noted that it's necessary to challenge tradition. For example, a systems engineer at Dannon may have a higher salary grade than a manager. "Making the right decisions on hiring and promotions is the most important factor in building successful teams," Kravchuk said. ■

PROGRAM THE UMPIRE

John McEnroe won't have umpires to verbally abuse anymore, at least not at this year's United States Open. Tournament officials have approved the use of a new automatic line-calling system that can detect the position of a tennis ball at least five times more accurately than the human eye, according to a recent report in *The New York Times*.

The TEL line monitoring system, from TEL Proprietary Ltd., an Australian firm, relies on special tennis balls infused with iron particles that will disturb an electromagnetic field. The field is created by burying cables, transmitter loops and electronic resonators beneath the 13 court lines. When a ball passes through a line, the field is disrupted. A 16-bit microprocessor, also embedded beneath each line, converts disruptions into data on ball position, elevation, trajectory angle and velocity, thereby determining whether the ball is in or out. Position information is relayed to a handheld computer that the chair umpire uses to control and communicate with the system.

More accurate calls can't guarantee that temperamental players like McEnroe won't feel tempted to vent their frustrations on the system. Better not. Fines imposed for arguing with an umpire don't come close to TEL's $80,000 price tag. ■



JIMMY'S BOOK REPORT WILL RETURN AFTER STATION IDENTIFICATION

For kids who shudder at the prospect of a parent-teacher conference, what's happening today in Birmingham, Mich., is the stuff of nightmares.

Parents in the Detroit suburb are communicating with their children's elementary school through an interactive TV channel that is the first of its kind in the United States. The Teachers' Assistance Program (TAP) allows parents to turn on their TVs at home and view their children's school projects or receive recorded messages from teachers and administrators.

In a trial of the system, two fourth-grade classes at Midvale Elementary School have incorporated TAP in their curriculums. Students write and illustrate their own books, which they then present on the channel for later viewing by parents. Teachers communicate brief messages about each day's activities and homework assignments. "The [teachers] previously spent a great deal of time writing newsletters," said Lisa Martinico, educational technology coordinator for the Birmingham Public Schools. "Now they easily update the information on the Interactive Channel.

"In many families, both parents work outside the home, and this program gives them access to what's happening in the classroom on a flexible basis," said Martinico. Parents enter an identification code and select programming from a graphical on-screen menu with their cable remote controls.

TAP is part of the Interactive Channel, operated by the IT Network of Dallas on Booth Communication's cable system. ■

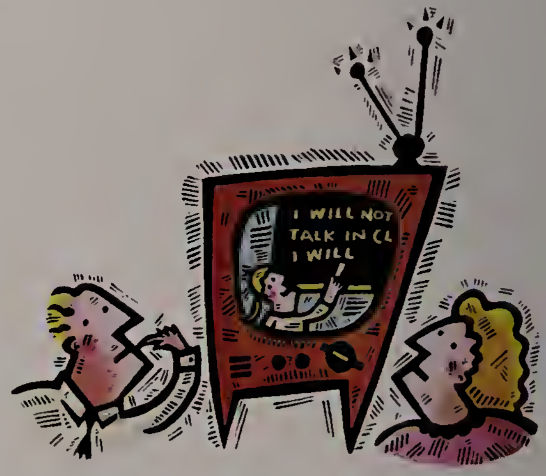


ILLUSTRATION BY FRAN O'NEILL

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Many and Varied

Smart companies treat the marketplace as a sea of individuals, each with his or her own specific needs and desires. Mass customization helps meet that multitude of demands.

BY B. JOSEPH PINE II

Customers today demand great variety—even individual customization—in their products and services. But increasing competition dictates that costs keep decreasing as well. Companies that once pursued either low prices or high differentiation are discovering that they can combine the best of both strategies in mass customization.

Mass customization is the mass production of individually customized goods and services. The technological capability to mass-customize products was anticipated in Alvin Toffler's 1970 book *Future Shock*, and the term was coined in 1987 by Stanley Davis in *Future Perfect*. Today's reality outstrips both authors' projections.

Just-in-time delivery, lean production techniques, concurrent engineering, time-based competition, cross-functional teams and a host of other advances have increased flexibility and responsiveness, allowing companies to offer variety and customization without accompanying cost increases. Indeed, building variety and customization into processes can actually lower costs.

Information technology is a critical enabler of the shift from mass production to mass customization. Most commonly, it supports or creates an infrastructure that collects information about individual customers and applies that information to the production process. Mass production relies on forecasts of future demand. Mass customization is based on what each customer wants and needs today.

There are six principal approaches to applying IT to achieve this worthwhile goal: creating a process infrastructure, integrating the value chain, building an experience warehouse, embedding intelligent functions, marketing to individuals and using precision pricing.

The Philadelphia-based magazine *Farm Journal* provides an interesting illustration of the first approach. Beginning around 1980, the magazine began customizing its 14 issues for individual readers. Subscribers fill out questionnaires about their farms (information about types of livestock raised, acres devoted to each crop, etc.). Their answers are entered into an online database. *Farm Journal*'s production process uses this information to create a magazine for each subscriber consisting of a 50-page editorial core combined with articles and advertisements applicable to that subscriber. Each month, hundreds, and sometimes thousands, of different versions of *Farm Journal* are sent to 800,000 subscribers.

The technology behind this capability is essentially a specialized flexible manufacturing system (FMS). In general, FMSs create a process infrastructure that enables all members of a family of parts to be manufactured at will and at random. Within

ILLUSTRATION BY DAVID FLAHERTY

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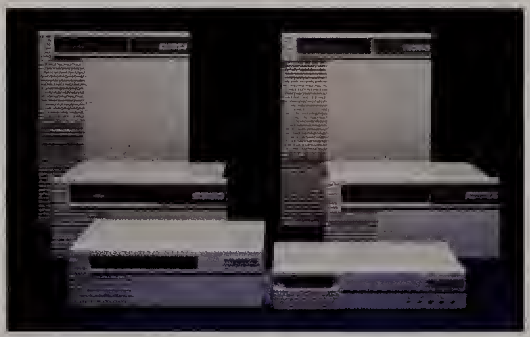

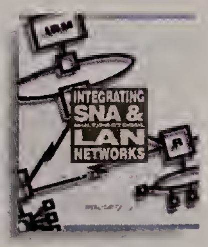

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a certain envelope of variety, there are no cost penalties for manufacturing one part versus another, yielding a manufacturing system that is very responsive to changes in demand. This capability can be extended through computer-integrated manufacturing, which links all the disparate computer-controlled "islands of automation" into a single, integrated information system that is fast, responsive, flexible and very low-cost at high volumes.

Service firms can also achieve individual customization by applying IT to their "production" processes. TWA Getaway Vacations Inc., of Mount Kisco, N.Y., provides customized tours for the price of standard vacation packages (sometimes less). The firm purchases components of the tour—airline seats, hotel rooms, buses and entertainment options—in bulk. Then customers design individual tour packages with their agents. Getaway Vacations' information system mixes and matches the available components and rapidly provides prices, tickets and itineraries.

Going a step further, the IT-enabled process infrastructure can often take over the entire development, production and delivery of customized goods and services. MusicWriter Inc., of Los Gatos, Calif., created the NoteStation touch-screen kiosk for point-of-sale manufacturing and distribution of sheet music and digitized synthesizer instructions. The IBM PC-based system allows retailers to electronically "stock" a virtually infinite number of licensed music titles. Customers can select a title from easy-to-use menus that describe the song library, transpose it into a specific key if desired, listen to the customized selection right then and there, and purchase it on instantly produced printed sheets and/or a disk.

France Télécom's Minitel infrastructure was originally devised to provide online directory assistance to a population of users growing too fast for hard-copy directories to keep up. Today, Minitel serves as a cheap and efficient conduit for virtually any online service. It provides participating organizations with centralized management, including transmission processing and customer billing. Using Minitel, the smallest service companies can gain economies of scope (savings are generated by variety rather than volume as users explore any service at a very low cost) for their marketing and distribution (they don't have the expense of collecting minute sums from hundreds or thousands of users every month). Public services available on the system number about 15,000; the incremental cost of adding a new service is so small that an average of 15 are added every day.

Five Paths to Mass Customization

Customize services around standardized products and services. For those with standardized outputs, this is the easiest and quickest way to start. Find out exactly what your customers want and need, and supply it.

Embed customizability in your products and services. The same product can become something different in each customer's hands.

Provide point-of-delivery customization. Move production (or at least its final step) out of a centralized facility to be closer to your customers, where you have the best information about what they want.

Deliver quick response. Eliminate all non-value-added processes and time from your value chain, creating flexibility and the capacity to add variety.

Modularize components to customize end products. Modularity can provide an almost unlimited amount of variety and customization. —*B.J. Pine II*

Companies just embarking on the journey to mass customization can also use IT to integrate their value chains. In the typical mass producer, high walls exist between internal functions and between suppliers that make up the value chain extending to the final customer. Every boundary provides an opportunity for miscommunication, turf battles, delays and quality defects.

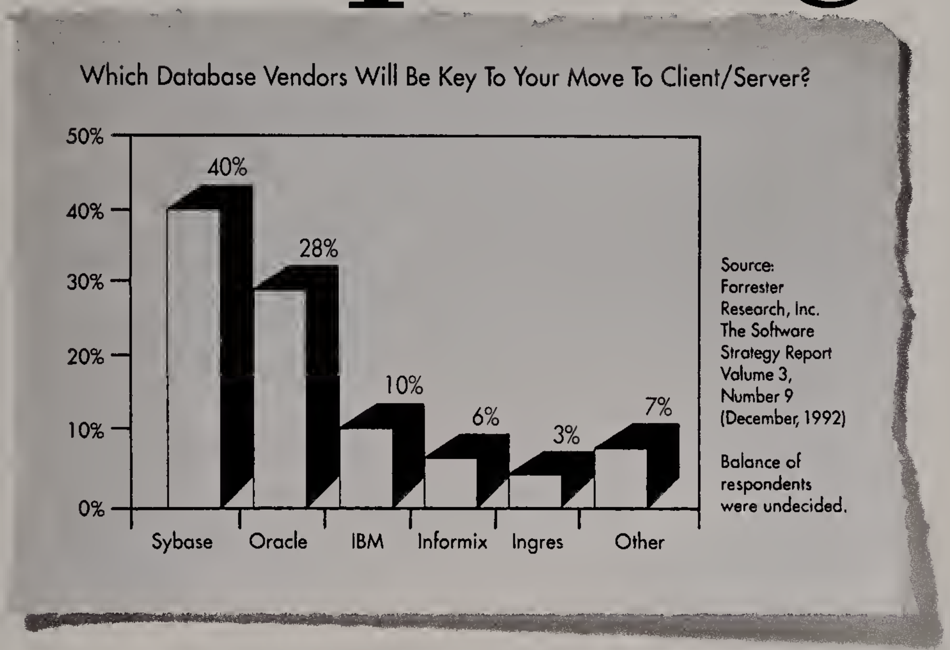
In mass customization, information flows seamlessly and immediately through each internal and external link of the chain, so that each person involved knows everything necessary to accomplish his or her task and is kept up-to-date about the changing end market. Each process can occur in parallel to an extent unimaginable without constant personal and electronic communications.

Electronic data interchange (EDI), E-mail and common databases are just some of the ways to achieve this. At the United Services Automobile Association (USAA), in San Antonio, Texas, image processing was used to eliminate the functional walls separating automobile, house and life insurance. USAA completely redesigned its policy-services processes, replacing paper files that made their way through the back office in batches with computer images instantly accessible by service representatives. Now when a customer calls, any service representative can handle any issue on any type of policy (see "Where Are They Now?" *CIO*, April 1, 1993).

In companies whose customer needs are less well-defined than those of the typical insurance firm, databases enable the instantaneous location of the person with the right knowledge to apply to a given situation. Bally Engineered Structures Inc., of Bally, Pa., has a database that lets sales reps immediately resolve customer concerns about the design of its customized building structures.

Victor Basili, a professor in the

The analysts have graphed the future of Client/Server computing.



And they have also spoken.

In recent issues of their ongoing reports, four of the most respected computer industry analysts have taken an unbiased look at Sybase, and its vision of enterprise-wide client/server computing.

They were impressed.

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All Things to All People

A firm builds its reputation on IT-enabled segment-of-one marketing

Bally Engineered Structures Inc., of Bally, Pa., mass-customizes walk-in coolers, freezers and other structures. The company's modularized and modifiable panels and accessories can be assembled in virtually endless variations for individual customers. To make this happen, said President and CEO Tom Pietrocini, "each employee must not only be empowered but also have access to relevant information to change the way work is performed." An IBM AS/400 running MAPICS manufacturing and other software has greatly increased the flexibility and responsiveness of both manufacturing and administrative processes. Using artificial-intelligence software, Bally has captured the decision rules of its configuration experts, eliminating all checking and rechecking while reducing the number of steps individual orders require. Customer requirements are fed directly into a computer-aided-design system that designs structures in four hours or less. The system generates a drawing that can be faxed to the customer's office for verification, and then feeds all the data to the MAPICS software to generate the bills of material for manufacturing. By enabling both segment-of-one marketing and precision pricing, this process capability "changes the whole dynamic of selling in this industry," Pietrocini said. *—B.J. Pine II*

department of computer-science software engineering at the University of Maryland, advocates going a step further: building an "experience warehouse" that packages experiences in the form of knowledge, processes, tools, techniques and products in a database for reuse throughout the corporation. An experience warehouse mass-customizes knowledge and experiences by allowing users to easily and quickly select from those in the database and tailor their selections for the task at hand.

When the functions customers desire are extremely well-defined, it is often possible to embed them within the product. Matsushita has introduced a washing machine that automatically personalizes itself—not only to the user, but to each load of wash. The machine uses optical sensors to determine the size and dirtiness of the load and microprocessors with fuzzy logic—an artificial-intelligence technique that can respond to small variations in attributes and learn to provide desired results—to select which of 600 different wash cycles will work best.

IT can also be applied to the marketing of mass-customized goods and services. Database techniques can be used to target and reach distinct market segments, niches, micro-niches and, finally, individuals. American Express Travel Related Services, in New York, captures every transaction its customers make—retail, lodging, entertainment, transportation—and then mixes and matches the customer patterns with company capabilities to add value for market segments and even for individuals.

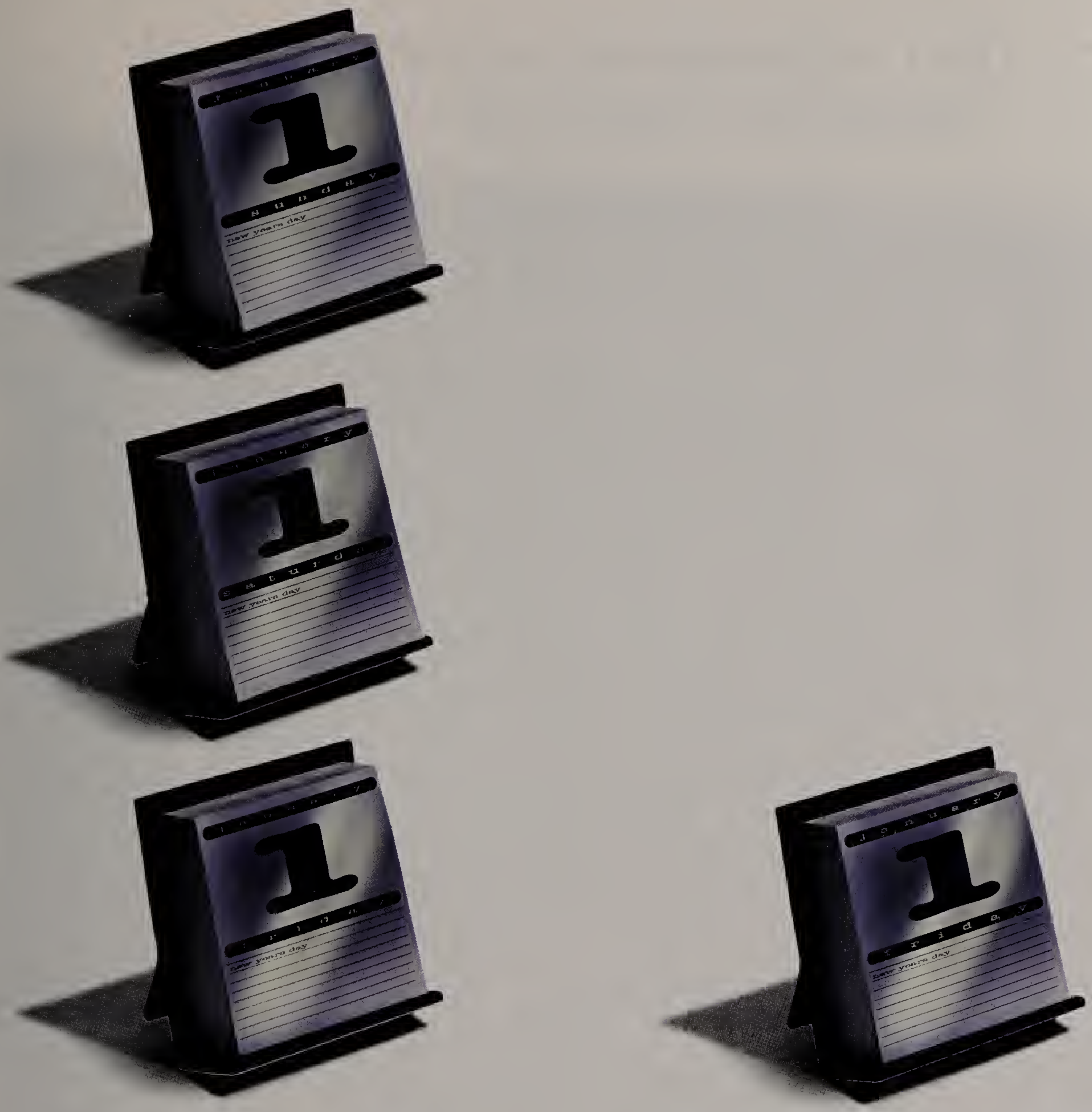
The simple storing and tracking of sales information can provide many avenues for customization. Airline, rental-car and hotel companies have a natural advantage here: Frequent-usage programs have forced them to develop databases that track the purchases of most customers. While not originally intended for mass customization, these databases allow for the customization of future experiences. For sustained success, this information must be used to provide feedback to development and production, enabling the creation of made-to-order, lot-size-of-one processes for individual customers.

Finally, IT allows companies to practice what William Davidson, associate professor at the University of Southern California's School of Business, calls "precision pricing." It is simple economics that a company should charge the most each individual will pay for its products or services. In mass-production firms, however, pricing economics became one of "guestimating" what single price would yield the highest profits. In mass-customization firms, pricing can be done to the individual.

Progressive Corp., of Cleveland, practices both pinpoint marketing and precision pricing, focusing on its "nonstandard pool"—people whose policies were canceled or rejected, generally because of previous accidents combined with "poor" demographics. By maintaining an exhaustive database on customers and analyzing demographics in great detail, Progressive can locate those in the nonstandard pool who are not much higher-risk than normal. For example, while motorcycle ownership alone may be enough to automatically place someone in the nonstandard pool, Progressive knows that middle-aged motorcyclists with young children do not have worse than average accident records. Progressive then calculates the price at which it can lure individuals from their current insurance firms, using one of 14,000 separately priced policies.

Leading companies with innovative IS organizations will continue to find new ways to apply IT to the mass customization of goods and services. Increasing competition from companies already taking advantage of these new technologies make it imperative that organizations begin looking for every opportunity to give customers exactly what they want, when they want it.

B. Joseph Pine II, author of Mass Customization: The New Frontier in Business Competition, *from Harvard Business School Press, is a program manager in management research with the IBM Consulting Group in White Plains, N.Y.*



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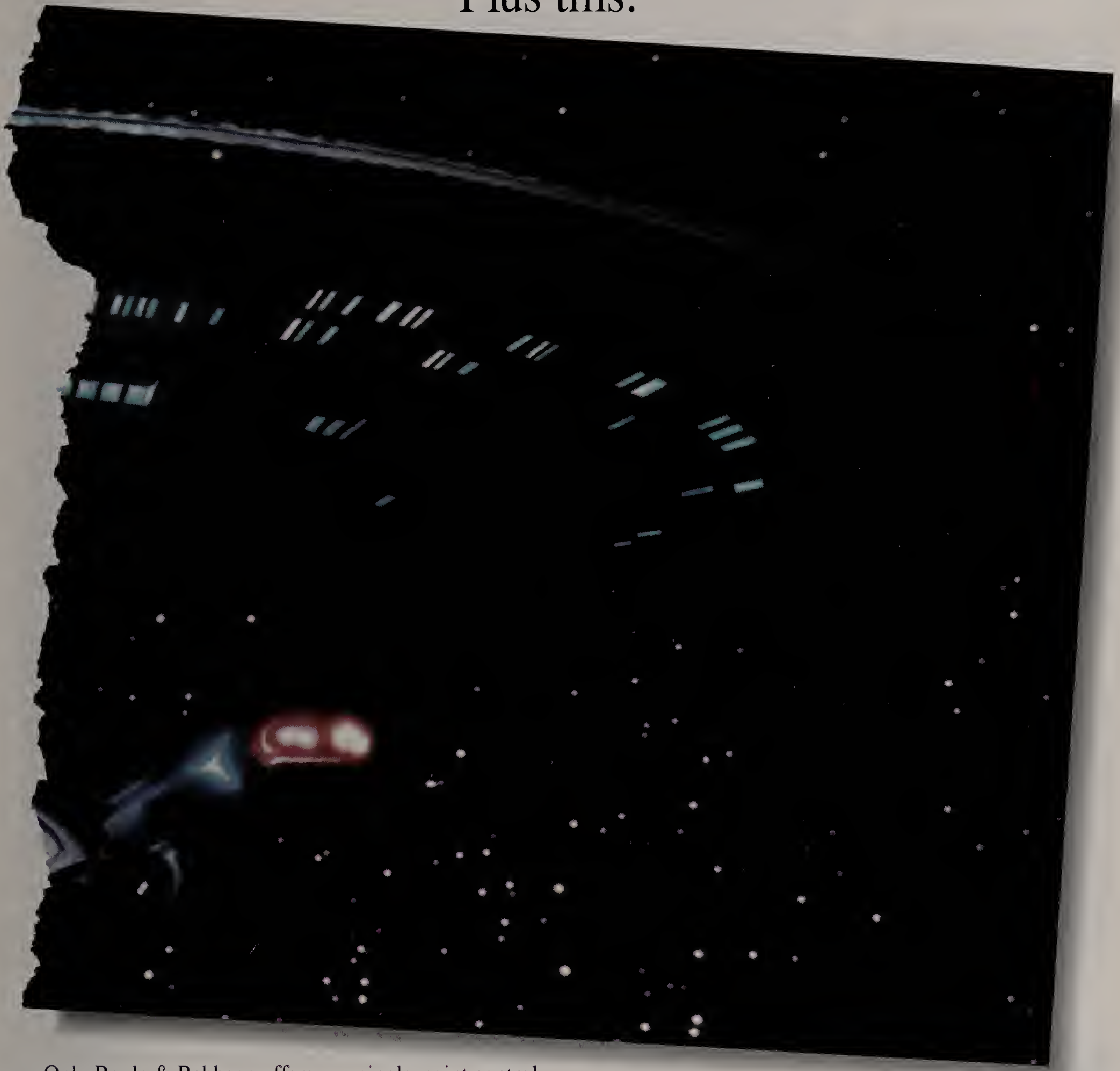

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SOMETHING OLD, SOMETHING NEW

A new *CIO* series asks four experts to offer opinions and advice on common IS management problems as illustrated by real-life case studies. This month's panel grapples with the fate of outmoded legacy systems.

BY RICHARD PASTORE

THOMAS GAUGHAN, senior vice president and CIO of New York-based Home Insurance, faces the common dilemma of legacy applications, mainframe-based dinosaurs 15 to 20 years past their prime. Many of these systems are neither flexible, user friendly nor efficient. They consume 60 to 65 percent of the firm's IS manpower merely for maintenance. Yet these systems are too enmeshed in the critical mission of the business to simply be shut down and put out to pasture. Therein lies the problem.

Home Insurance has to take action soon. "In many cases, the systems are no longer responsive to the needs of the business," Gaughan said. "It's been recognized for some time, but it's getting to the point where it's inevitable that we do something." Old applications designed for personal-insurance policies are having trouble coping now that the firm has shifted its business toward low-volume, complex commercial policies.

Gaughan hopes to switch from IBM 3090-based monolithic systems to smaller platforms running prepackaged applications wherever possible. A centralized data repository—an impossibility, given the historically fragmented design of legacy systems—would eliminate redundant databases and applications, as well as trim the maintenance burden. New systems would also present a more user-friendly interface, aiding efforts to increase users' involvement in running their systems.

Home Insurance has already taken the first steps in evaluating which legacy systems are worth saving and

SUBJECT

Home Insurance, New York
Industry: Insurance
Revenue: $2.5 billion
Total employees: 5,000
Total users supported (legacy systems): 3,000
IS staff size: 350
IS executive: Thomas Gaughan, senior vice president and CIO

OBJECTIVES

- **Reengineer or replace 15- to 20-year-old legacy systems no longer responsive to business needs**
- **Reduce the current maintenance workload of 60 to 65 percent**
- **Eliminate database and application redundancy**
- **Move to smaller platforms running user-friendly, prepackaged applications**

CONCERNS

- **How do we determine whether to reengineer existing systems or totally replace software and hardware?**
- **What parts of the legacy applications should we reuse, if any?**
- **How can we lighten our maintenance burden?**
- **How do we convince user managers and corporate executives of the bene-**

PHOTO BY KENT HANSON

THOMAS GAUGHAN: *"The systems are no longer responsive to the needs of the business."*

which are beyond hope. "We're looking at the current applications' business functionality and technical quality," Gaughan said. The evaluation team at first included only IS staff, but plans are to involve users as well. Gaughan acknowledges the possibility of a continuing role for some old systems as back-office number-crunchers.

Gaughan also realizes that the cost-benefit equation for this expensive effort is bound to come under intense scrutiny. One way to demonstrate the benefits to the business side, he believes, is through improvements to work processes. Toward this end, the company has already begun an evaluation to determine how work processes might be reengineered under proposed new systems.

In the meantime, Gaughan remains open to suggestions on how best to grapple with this multifaceted, common IS conundrum.

fits of moving away from legacy systems?
- **Is building a central data repository a good first step to take?**
- **Are there prepackaged industry-specific applications we can exploit?**

RAYMOND DASH
Northwestern University

PAUL STRASSMANN
U.S. Military Academy at West Point

DONALD DePALMA
Forrester Research Inc.

PETER COHEN
Coopers & Lybrand

Raymond Dash, *adjunct professor of information systems, Kellogg Graduate School of Management at Northwestern University, Evanston, Ill. Retired in 1991 as senior vice president of IS at Benefit Trust Life Insurance in Lake Forest, Ill.*

Home Insurance's legacy concerns are no different from those of any other insurance company. Since the industry was an early user of transaction-processing systems, its legacy issue is both older and larger than that of most other industries. Yet you can't compete in the future if you do nothing about these systems. Mr. Gaughan, your firm needs to recreate systems that will support the business strategy, be responsive to business changes, be highly reliable and maintainable and yield a high benefits-to-cost ratio.

In deciding which legacy systems to reengineer, you should keep in mind that designing and implementing an updated version of the same old system yields very little in benefits. Since legacy systems typically supported departmental functions, the best candidates for change are in areas where workflow reengineering has already transformed functional work structures into process-oriented structures. (In functional structures, work moves from department to department, and each employee works on a portion. In a process situation, employee teams take charge of work from beginning to end.) You have already taken the first step by studying potential work-process redesign. When you reengineer systems to support these new processes, you'll get significant payback.

We did exactly that at Benefit Trust. First we redesigned one department's workflow, which reduced turnaround time from 40 to 28 days. Then we reengineered the related legacy systems, further reducing that time to five days. We also went from 26 people spread across five departments to about 12 workers in one department, divided by geographic regions. Lower error rates and a general improvement in customer service reversed a potential market-share decline into a market-share increase.

Unfortunately for you and your fellow CIOs, user management generally doesn't understand the magnitude of the problem of maintaining old systems. You need to show them some truly value-added enhancements to win their support to convert your legacy systems. One of the best ways to do this is to create an integrated, enterprisewide database that users can access directly to perform their own what-if queries.

> "You should be moving toward distributed computing because it saves money in the long run, but the cost to convert everything right off is prohibitive."
>
> –*Raymond Dash*

At Benefit Trust, we created a pilot to show users how they could go directly into the database, gather data and download it to their PCs, as opposed to going through IS to request reports. That's what they find most valuable. You'll want to come up with an enterprisewide database design, then create physical databases for each line of business—casualty, life, etc. Each specific database should fit that overall model; then you convert the current data structures into your new database. This enterprisewide database is a prereq-

RAYMOND DASH: *"You need to show user management some value-added enhancements."*

PHOTO BY NEIL MACDONALD

PAUL STRASSMANN: *"First, construct life-cycle models for your legacy baseline."*

uisite for any conversion approach you may select.

A major problem in reengineering legacy systems is recreating the business-specific logic—for insurance, this could be commission and premium calculations. This may be only 20 percent of an application's programming, but it's the most difficult part to recreate. An approach I took was to pull the business-specific Cobol modules out of our legacy systems and use them with minimal modification in the new systems. (If the business logic was OK in the legacy system, then it should be OK in the new system). As for the remaining 80 percent—the front-end interfaces, the database-access programming—all that can be rebuilt using computer-aided software engineering tools or client/server GUI software communicating to database servers.

Remember, there's no big rush to get off the mainframe. You should be moving toward distributed computing because it saves money in the long run, but the cost to convert everything right off is prohibitive. The mainframe could be part of this architecture for some time, possibly serving as a very large database server. The need to create new systems is a good excuse to migrate to client/server platforms. But there's no need to move adequate mainframe-based legacy systems to smaller platforms immediately.

Paul A. Strassmann, *visiting professor at the U.S. Military Academy at West Point, in West Point, N.Y., former principal deputy assistant secretary of defense for command, control, communications and intelligence at the Pentagon.*

Legacy systems are the number-one issue facing IS today. The thorniest problem is managerial—how do you deal with the enormous proliferation of redundant applications? If you draw a flow diagram, legacy systems will look like an Old West shantytown that has been jerry-built structure by structure over time. Many of these structures may be quite valuable, even if only as a source of seasoned lumber for use in building new structures somewhere else in the county. So you have to do a thorough analysis before you go and burn it all down.

The biggest mistake organizations make is rushing into technology solutions before they know the economics of what they're dealing with. In the defense department, there's a saying that if you don't know where you are, a map won't help you. Mr. Gaughan, you first need to construct life-cycle models for your legacy baseline—determine what will happen to cash flows if you do nothing to the systems. In every situation, the first option is to do nothing.

What will stand out from your legacy-system analysis is the very high maintenance costs. But that is really only an issue in a small number of the cases. The bulk of the legacy life-cycle penalty comes from functional costs to the business—delayed turnaround times, misreported inventory levels that lead to emergency shipments, and so on. Further, a maintenance burden that consumes 60 to 65 percent of the IS workforce may not be bad in itself. In fact, if you have a good architecture, you may do quite well spending all your time maintaining and upgrading systems, never needing to develop new major systems.

How do you convince customers of the importance of migrating from legacy systems? Maybe you can't, or shouldn't. You're spending their money, so customers have to be the ones who decide what they're willing to pay for. Your job is to provide the lowest possible technology costs for the exodus from legacy applications. When you suddenly go to a different architecture, there are enormous training and conversion costs—all of these being customer costs, not IS costs. So the IS manager is strictly a supplier in this relation-

PHOTO BY KENT HANSON

DONALD DePALMA: *"Your action plan will look like triage in a field hospital."*

PHOTO BY WEBB CHAPPELL

ship, and the decision-making is up to the customer.

Furthermore, if the legacy systems are not exactly meeting user needs, that doesn't necessarily mean they must be scrapped. In your analysis, determine what the penalty might be for not meeting those needs. It's not always necessary to satisfy every internal customer's wishes. I have seen customers who made the IS department spend several hundred thousand dollars to save the time of two part-time clerks.

You really have to look at how you can salvage some of your existing systems. This should not be based on potential reductions in development costs. The real savings come in accelerating the development schedule. If a computer application has a high payoff, then the variable that matters most is not development cost, but speed of implementation. If it helps you save eight months on implementation time, you may want to salvage and reuse some existing code despite its antiquated history. You can always go back and redo those pieces. Remember that 70 percent of all development effort is expended to contribute just 10 percent of the value.

Finally, it's a common judgment to begin a migration from legacy systems by building a central data repository. However, this begs caution. By cannibalizing application data, the implication is that you will eliminate redundant databases. But in a typical firm, you can't take out the data first, otherwise how would those existing applications get at the data they need? A better approach would be to start the migration with the high-payoff core application, bringing over only the data pertinent to that system. Then, as the core application is extended, you slowly disconnect life support to ancillary applications. Over the course of this long process, you must show well-thought-out evidence that the corporation will be protected from the potential disaster of lost files.

Donald DePalma, *senior analyst, software strategy service, Forrester Research Inc., Cambridge, Mass.*

Mr. Gaughan, your company's plan of attack is sound. Getting rid of unresponsive systems, eliminating application and database redundancy and moving to packaged solutions will lessen your maintenance burden considerably. But first you must leap a political hurdle. Maintenance is incremental, so it's easy to justify spending additional resources on a 15-year-old Cobol application because so much investment has already been sunk in. At the same time, new development is risky. ROI sometimes isn't clear until the full application has been finished. And there have been enough large-scale development failures—AMRIS with the Confirm project comes to mind—that many managers are unwilling to take the risk. Users are begging for thousands of minor fixes and enhancements, and it's a whole lot safer for you to satisfy these requests than to start the redevelopment equivalent of Sherman's March to the Sea.

Your first priority should be to step back from your portfolio of legacy applications and survey the landscape. The goal is to develop an action plan that will look amazingly like triage in a field hospital: Some applications will be left to die because they're too far gone, others are healthy enough to wait for care, and the balance will demand immediate attention. You should use a combination of business and technical metrics to develop a triage model for your legacy portfolio.

For the business metrics, consider whether a given application is important to the business. The best way to determine this is to imagine what would happen if you pulled the plug on that application. Pose the following informal tests.

Scream test: With the system out of commission, how many people would scream? How loud? How senior are they?

Money test: Does unplugging the system affect profitability, revenue or costs?

Time test: How long does it take anyone to notice that the system has gone away?

Technical metrics determine the quality of an application as a function of its technical efficiency, maintainability and flexibility. Consider the annual maintenance cost and the cost to build a replacement application using updated technologies like client/server, local area networks and graphical-user interfaces.

Next figure the "maintenance ratio" for each application: the annual maintenance cost divided by the

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2. Are your customers as loyal as you want?

☐ Yes ☐ No

It's one thing to gain customers. It's another to keep them. The strength of your business depends largely upon your ability to sustain a relationship with customers.

3. Do you generate as much business from each customer as you want?

☐ Yes ☐ No

A critical component of business growth is increased sales content. To maximize each business opportunity, you need a way to leverage your entire organization—to bring it totally to bear at the point of customer contact.

4. Do you really know what your customers want?

☐ Yes ☐ No

Are you alert to *every* product your customers could use? *Every* service that might interest them? *Every* transaction they're prepared to make? *Every* sale they'd allow you to clinch? Are you thoroughly tapped into your market?

5. Does your entire organization know what your customers want?

☐ Yes ☐ No

A customer orientation has limited value unless it's embedded in the very fiber of an enterprise—at all levels, and at every place that directly or indirectly impacts the customer.

6. Is your information strategy focused on helping you hear what customers and markets are trying to tell you?

☐ Yes ☐ No

The next best thing to reading your customers' minds is listening to what they're saying. But unless you're constantly tuned in to customers' signals, you're missing messages that could guide you to greater results for your business.

7. Can your organization respond quickly to what customers and markets are telling you?

☐ Yes ☐ No

When the flow lines of your information system are not within your customers' reach, you won't always sense when opportunity knocks. But even if you do, getting the message is not enough. If you can't reply rapidly to market cues with information, products and services, revenue opportunities are lost.

8. Does your information strategy enable you to proactively deliver information to your customers?

☐ Yes ☐ No

Many business plans underestimate the power of information to build customer relationships. But imagine the advantage of an information technology strategy that transforms information into customer-generating, revenue-generating fuel.

9. Are the full capabilities of your organization accessible to your customers at all your field locations?

☐ Yes ☐ No

An office. A branch. A retail site. To a customer, that's your company. One small part of the whole. Which is why you need to leverage your entire organization by extending its capabilities to each point of customer contact.

10. Does your information strategy reflect the bottom-line importance of customer service?

☐ Yes ☐ No

Business is built on customers. Without them, there is no bottom line. Government is also built on customers, the public. And whether you're in the business of commerce or the business of government, no objective of an information strategy is more fundamental than enhanced customer service.

The Bottom Line. *If you answered* No *to any of these questions, you're not yet customerized. But you might well agree that this simple test suggests the enormous advantages of becoming customerized. And as the leader at customerizing business and government, Unisys will work with you to provide the answers you need.*

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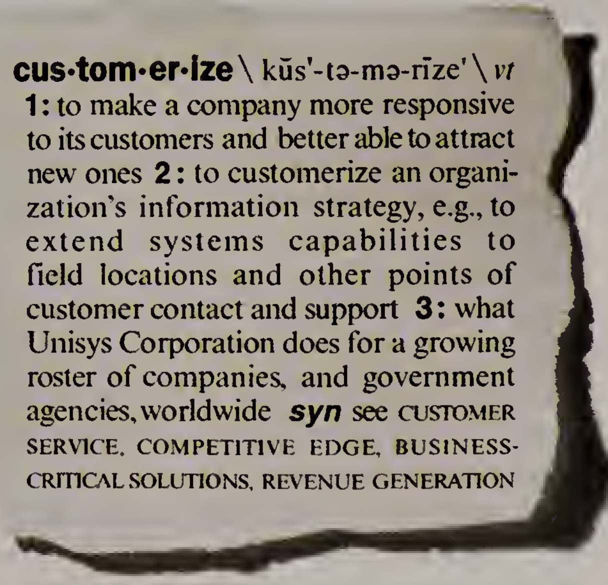

cus·tom·er·ize \ kŭs'-tə-mə-rīze' \ *vt* **1:** to make a company more responsive to its customers and better able to attract new ones **2:** to customerize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide ***syn*** see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

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PETER COHEN: *"Partial vs. full replacement depends on the systems' salvageable components."*

redevelopment cost. For example, an application that costs $50,000 to maintain, but would cost $1,000,000 to redevelop—a ratio of .05—is probably good technology. Anything below .10 is OK, but a maintenance ratio between .10 and .30 is suspect, and a ratio above .30 is an application that needs help.

Using these business and technical metrics, Home Insurance should be able to map its application into a "Legacy Triage Matrix":

Junk: These are programs with little business value and a high maintenance ratio. You may be surprised to find that a large percentage of applications are no longer used, needed or even wanted. But your staff is probably still maintaining things like unused reports and asset management for unused facilities.

Low business value, good technology: These applications are probably irrelevant to today's business needs. Some of them probably could—and should—be enhanced to solve current business needs, and the others toe-tagged as junk. For the "keepers," use new technology to add new functions that make them more relevant.

High business value, bad technology: These applications are probably where you are spending most of your maintenance dollars. The programs perform key functions, but at great expense. Home Insurance should migrate these applications posthaste to more cost-efficient, nonproprietary technology or redevelop them for client/server.

Survivors: These are the programs that are doing fine today. Leave them as they are, but revisit them every 12 months.

What will you get out of this? Over the next few years, you should see the maintenance portion of your total budget decrease to no more than 50 percent. That means you'll have more money to spend on developing downsized applications or acquiring packaged solutions. You should also see an improved link between technology and profit. But it won't be painless: Expect increased friction with users, who won't see many benefits in the near term but who will see their enhancement requests go unheeded. And some people on your staff won't be able to make the transition.

Peter Cohen, *partner in the technology delivery services group of Coopers & Lybrand in New York.*

For a company like Home Insurance, the overall approach to legacy systems is driven by functional and technical issues. Partial versus full replacement depends on the systems' salvageable components. In my experience with Coopers & Lybrand clients in the financial-services industry, compelling business drivers didn't allow these companies time to develop new, replacement systems. For one thing, the systems were mission-critical. At the same time, the legacy systems contained extensive value that would be too time-consuming and costly to replace. So from a practical standpoint, there was no option of total replacement. Instead, critical system components were added, reengineered or replaced in order to meet their business needs. Mr. Gaughan, if your systems are subject to these same constraints, I'd advise you to do likewise.

My first client example, a financial-services company, had an urgent need to develop a new service product. Because the new service would radically increase business volumes, it required a 24-hour, real-time environment in place of the existing overnight batch cycle. Unfortunately, it would cost too much and take too long to replace the existing mainframe systems.

The approach we took was to retrofit new system components with

PHOTO BY KENT HANSON

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Panelists' Findings

- Don't rush to migrate from legacy systems before fully analyzing the costs.
- Fully replacing legacy systems is costly and time-consuming. A hybrid approach of new development, rehabilitation and replacement is more practical.
- Use metrics to classify legacy systems by relative business value and soundness of technology. Then treat them accordingly.
- Reuse what you can, particularly the business-specific logic code.
- Reuse legacy code if it dramatically shortens new-system implementation time.
- Reexamine and reengineer work processes before overhauling legacy systems.
- Packaged applications may only be viable for standard, standalone processes.
- Political pressures will weigh hard on the side of maintaining the status quo.
- Expect friction with users whose enhancement requests cannot be fulfilled during the migration.
- Win over users by demonstrating what value the reengineering effort will add for them.
- Leave decisions in the hands of the users.
- Moving to a client/server architecture will save money, but only in the long term.
- Maintenance burdens may not be as significant as such functional costs to the business as delayed time to market.

the existing systems. We implemented a real-time, Unix-based client/server front end. By linking this front end to a midrange platform and an existing host via TCP/IP, we provided 24-hour support and recovery. Little change was necessary to the host, which became the back end of the system. We did convert the host to IBM MVS-DB2 for performance reasons; volumes had outgrown IBM DOS/CICS. Using this retrofitting solution, we helped the firm deliver its new service in just nine months. That in turn allowed it to capture a new market by being first to market with the service.

My second client example is a credit-card firm that faced excessive costs in a low-margin business. It needed a friendlier, easier-to-learn environment for its 1,000-plus interactive users who handle customer telephone calls while on the system. Upgrading the mainframe and its old Cobol-VSAM applications would have been a very large undertaking.

Our approach here was to take advantage of the lower-cost MIPS available through a client/server architecture for online applications and user interfaces. We ported online applications to IBM RS/6000 workstations, retaining the Cobol CICS software environment. We created a friendlier user environment by converting the user-interactive parts of the applications to a graphical user interface on intelligent workstations. We retained the mainframe host for overnight batch workloads, including primary file updates.

With this solution, we were able to reduce hardware and systems software costs by 40 percent. At the same time, we provided greater hardware scalability to satisfy business-volume growth. In addition, we enhanced customer service through greater system responsiveness. More customer inquiries are now resolved during the initial telephone call.

We used application packages to a limited extent with these clients, and then only for standard, standalone processes. Industry-specific application packages generally require total replacement of applications on the platform the package supports. Consequently, they aren't viable without a commitment to total replacement. If you want or need to retain significant parts of your legacy systems, then packages aren't a very practical solution.

To address your maintenance concern, outsourcing is one viable option. However, maintenance outsourcing is usually not a long-term option. Most companies use outsourcing to allow their own development resources time to focus on new systems, which eventually would replace those being maintained by the outsourcer.

EDITOR'S NOTE

This month, CIO *inaugurates a new series of features. "Second Opinions" will take real-life issues facing real-life information executives and present them to a panel of experts—IS practitioners, consultants, academicians and non-IS executives—for evaluation and advice. While our revolving panel of experts cannot explore all the possible solutions in this limited space, we hope that by suggesting a few strategies, they may contribute to a better understanding of serious, common concerns for IS executives and other business leaders. We also plan to check back with our subjects to see how they chose to address the issue and to report on their progress.*

We invite our readers to offer topic suggestions and/or serve as case studies for future articles. Please contact Richard Pastore at 508 935-4435.

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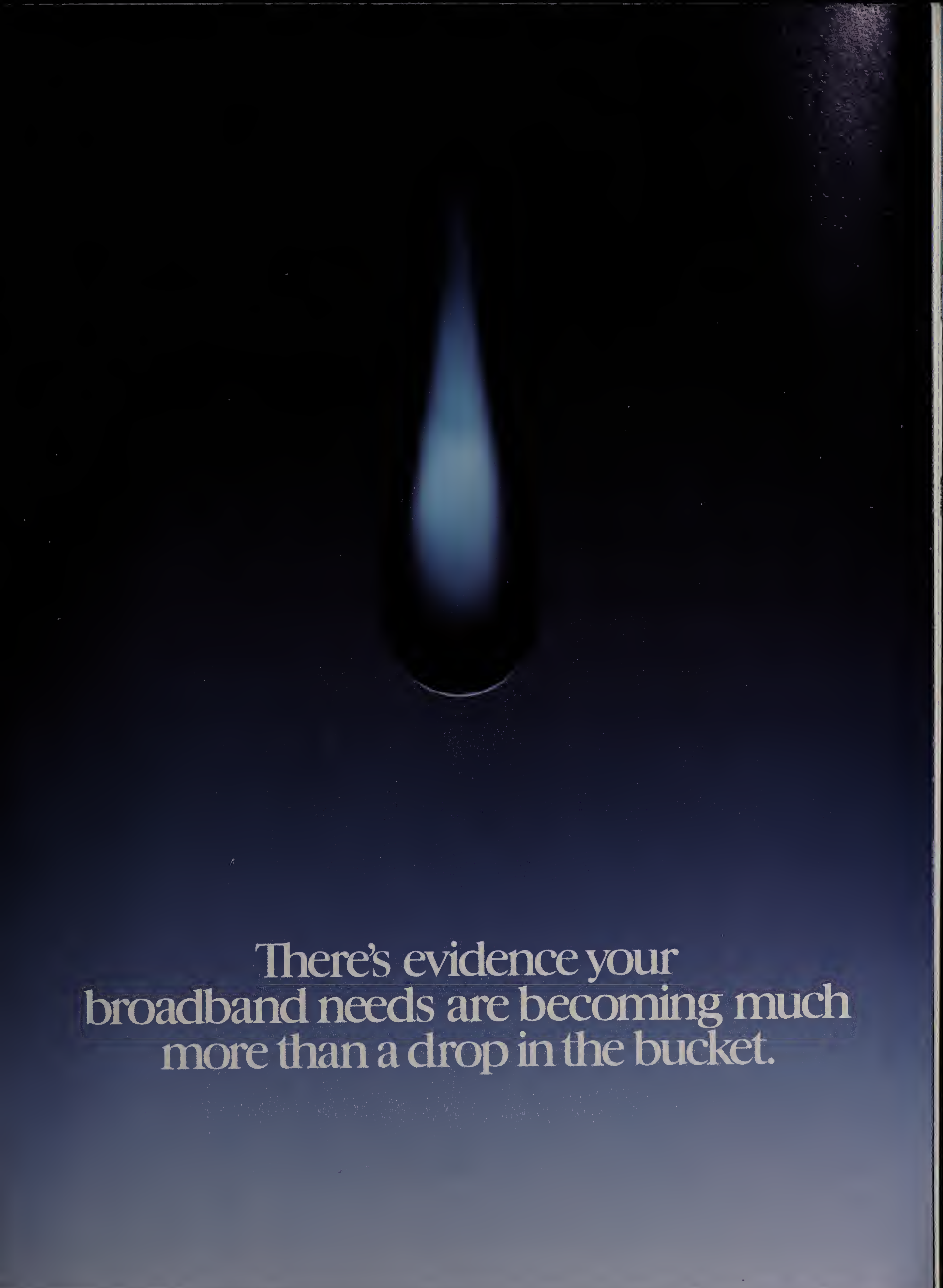
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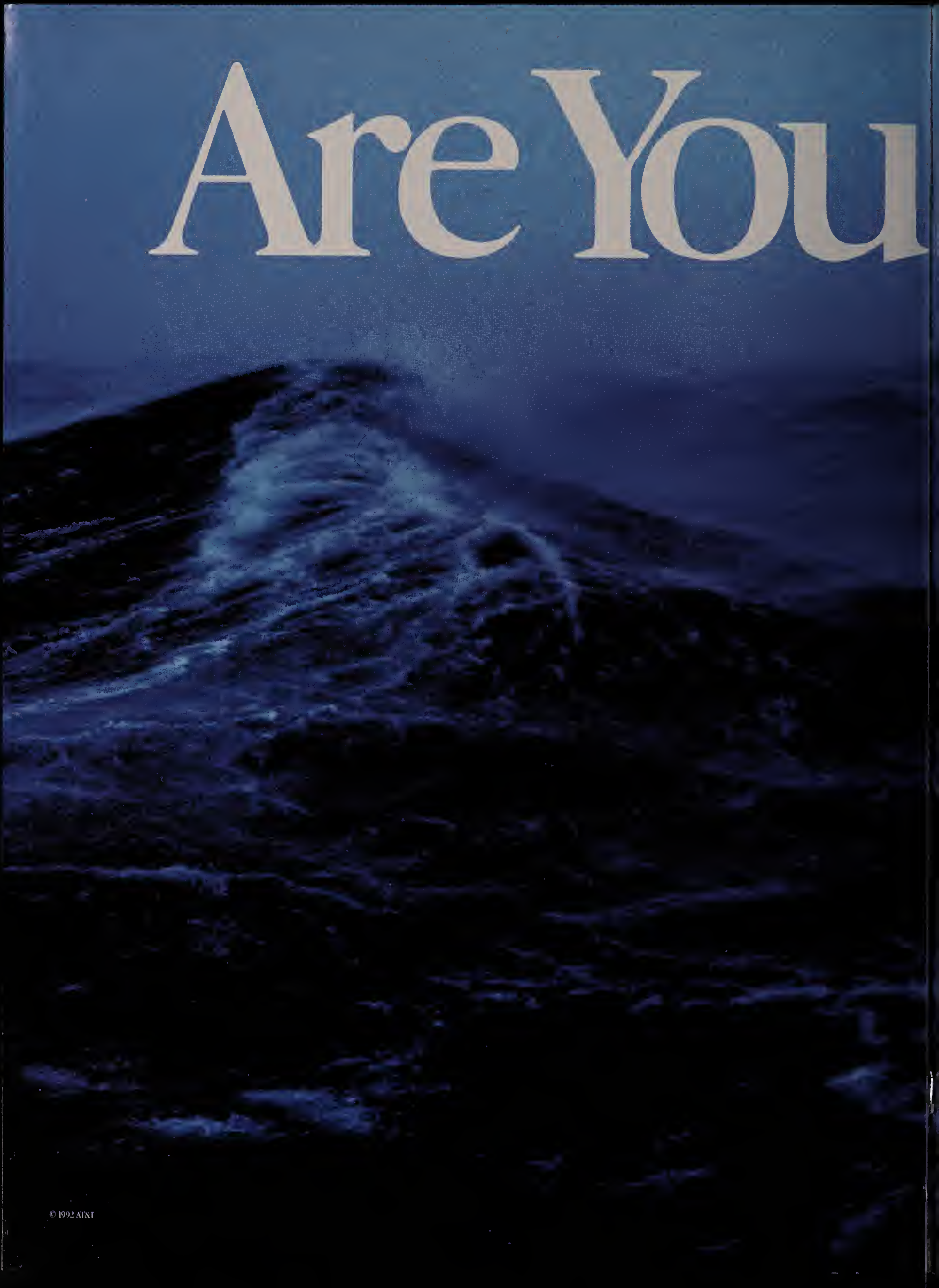

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ENTERPRISE NETWORKING

DEMOCRACY AT WORK

By distributing information laterally throughout organizations, enterprise networks bring power to the people. This speeds product time to market and improves customer service. It can also threaten managerial fiefdoms and make controlling valuable information resources and technology assets a nightmare.

The Forces of Democracy

Networks allow more distributed—some say more democratic—channels of information to wend their way through organizations. But that can be either good news or bad, depending on how it affects you.

PAGE 50

An Internal Technology Poll

For years, IS departments looked upon PCs as just another office supply. Departments carried the costs, so what did IS care? But now, as LANs are becoming more prevalent and critical computing platforms, senior executives have begun to realize that these scattered assets add up to big bucks.

PAGE 54

Governing the Multiparty System

Supporting a range of computers and networks is no cakewalk. Each type of equipment requires its own management system (and the technicians to operate it), and none communicates naturally with the others. Nevertheless, many believe there are solid business reasons to enable and support IT diversity.

PAGE 60

A Democratic Reform Movement

With deregulation looming, utilities that fail to lower costs and improve service to customers could find themselves edged out by agile new competitors. At Florida Power Corp., the need to be flexible and responsive has driven the move to a cooperative architecture within which all devices "know who they are, what they do and where they can go to get whatever else it is they need," said Director of IS James Pollard.

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ENTERPRISE NETWORKING

THE FORCES OF DEMOCRACY

By opening up the flow of information, LANs can radically affect the power structures in an organization. And that has some people worried.

BY THOMAS KIELY

Were he alive today, and in charge of enterprise networking for a major corporation, Walt Whitman might write an ode to the LAN, beginning with the line, "O, Maker of Democracy!" Look at Ashland Oil Inc., for instance, where computing work is shifting from mainframes to LANs—including some critical applications. This has allowed business units to trade among themselves information that once went up the corporate hierarchy, then (sometimes) back down to peers in dispersed units. With LANs, more business information now flows horizontally than vertically at Ashland.

"Over time, this [redirection in the flow of information] will probably bring some changes to the nature of the organization," speculated Gaige Paulsen, CIO at the Ashland, Ky.-based company. Such as? "A reduction in the number of people required to do things and a flattening of the organization," he said.

CIOs and senior executives in corporations coast to coast echo Paulsen. The consensus is that networks allow more distributed—some say more democratic—channels of information to wend their way through organizations. But that can be either good news or bad, depending on how it affects you.

The pace of networking is heady. Richard J. Murray, principal at Nolan, Norton & Co., a Boston-based technology-man-

GAIGE PAULSEN: AT ASHLAND OIL, MORE BUSINESS INFORMATION FLOWS HORIZONTALLY THAN VERTICALLY.

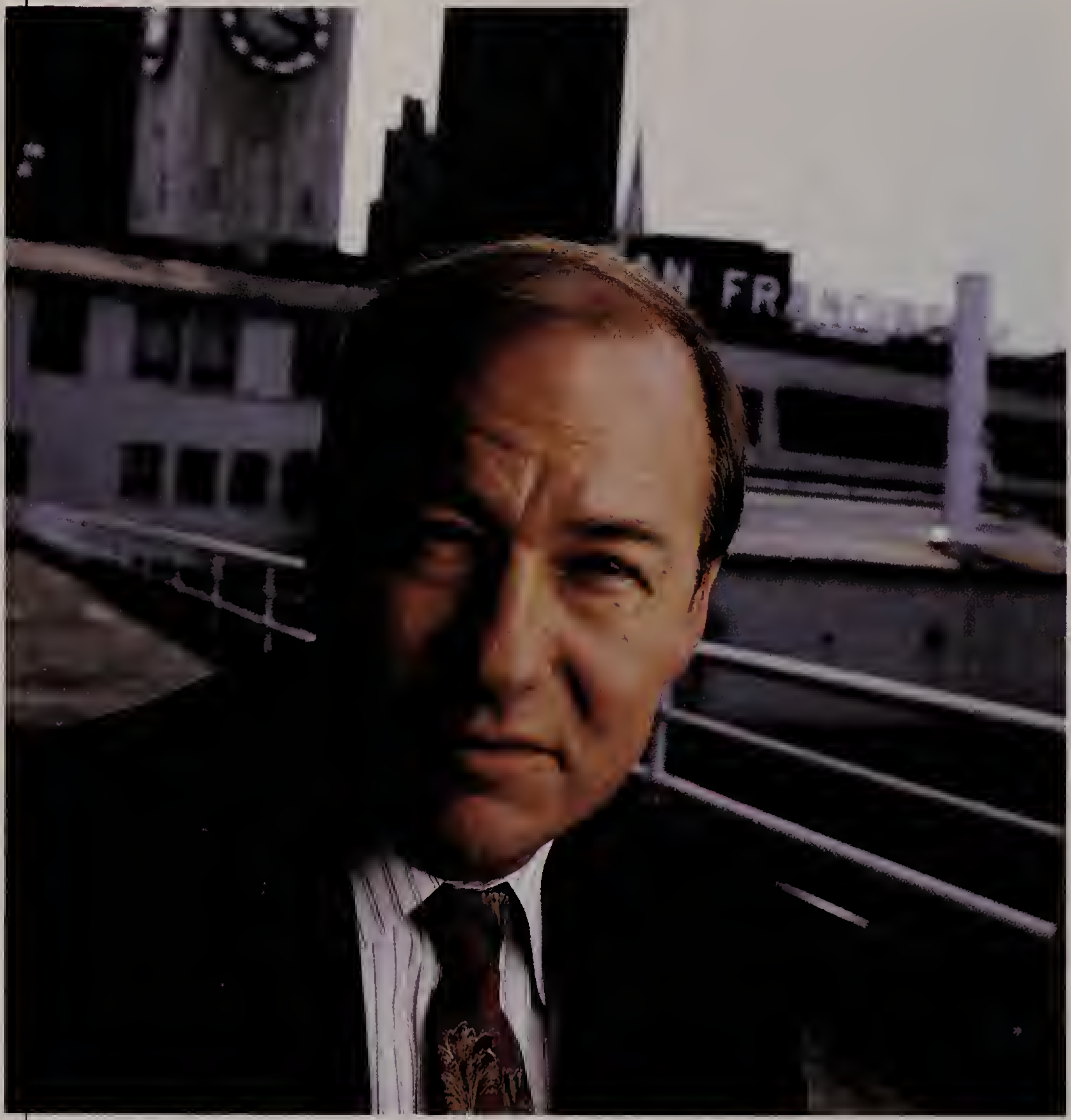
PHOTO BY JACK VAN ANTWERP

Ashland

"LANS ALLOW people to work and share information as if they were right next to each other, and that gives managers greater flexibility to reshape processes." -Larry Levitt

agement consulting firm, estimates that five years ago, only 5 percent of all personal computers within companies were linked together. Today, 70 percent are. LANs provide new opportunities that some executives applaud: empowered end users who are close to customers, streams of real-time business information for managers, borderless companies linked by EDI networks, just-in-time schedules, strategic alliances, virtual meetings on multimedia networks.

LANs are a tool for redesigning the operations of an enterprise. Take Chase Manhattan Bank. Chase's senior vice president and CIO, Craig Goldman, says that cross-functional LANs are critical to the bank's efforts to restructure its business around products and customers. "Power has changed in the organization," he said. "It's a culture change [initiated for business reasons], and it's facilitated by LANs and communications."



LARRY LEVITT: INFORMATION AT PGT WILL BE ABUNDANT, INTEGRATED AND OPEN TO NEW WAYS OF COMPILING AND ANALYZING BUSINESS FACTS.

PHOTO BY DAVID POWERS

One of Goldman's goals is to help the bank's front-office client contacts to become, in a sense, self-sufficient. He wants to provide to their desktops virtually all the information necessary to meet customer needs. That means shared pools of information, available to employees around the globe. To this end, he has become an enthusiastic user of Lotus Development Corp.'s Lotus Notes, a product designed for sharing enormous amounts of disparate information across LANs. "Notes facilitates collaboration [of work]," he said. "And [collaboration] has literally changed relationships in key areas in the bank."

Like Goldman, Larry Levitt, manager of computer services at Pacific Gas Transmission (a subsidiary of San Francisco-based Pacific Gas & Electric Co.), hails the changes in information flow at his company. PGT is in the midst of a complete overhaul of its information systems, pitching a centralized IBM AS/400 architecture in favor of an enterprise LAN. The network will support a business that is intended to be flexible, an organization that will be flatter (and organized around processes) and operations that will revolve around strategic project teams—communicating desktop to desktop.

End users will no longer have to live within the information limits of discrete, centralized systems, Levitt said. Instead, information will be abundant, integrated and open to a variety of new ways of compiling and analyzing business facts. "Users will get on-demand information," Levitt said. "Networking is fundamental to the way we will do business. LANs allow people to work and share information as if they were right next to each other, and that gives managers greater flexibility to reshape processes."

Bear in mind the context within which these changes occur. LANs are not the demons of change within the enterprise, noted David Daniels, senior planning consultant in the investments arm of Metropolitan Life Insurance Co., headquartered in New York. Rather, LANs are the messengers. Chase Manhattan's Goldman would agree: His bank's cultural metamorphosis was launched by managers. Technology is a tool for that, not the impetus.

But how much control do managers have over the changes they set in motion with the help of LANs? Are the effects of LANs altogether predictable? Historians of technology point out that technological change that is swift and pervasive will set off a range of other changes, like a chain reaction.

Even now, in most large corporations that harbor multitudes of LANs—many of which are being linked together across the enterprise—information is no longer flowing in straight lines. Increasingly, the mainframe is no longer the sole repository for relevant data. Instead, information can be processed, packaged and retrieved in any number of structural genres beyond those dictated by mainframe software. End users can communicate peer-to-peer, anywhere-to-anywhere, in ways never dreamed of with E-mail systems.

Surprises lie ahead. At MCI Communications Corp. in Washington (another Lotus Notes user), small departments such as the library are able to provide information to a wider corporate audience, gaining greater prominence within the enterprise as a result. And at Dell Computer Corp., of Austin, Texas, employee groups have created a variety of new network databases inside Lotus Notes, as ad hoc teams (that form, accomplish a task, then evaporate) use Notes as a primary communication tool. Some managers are concerned about their control over workflow.

Open, unfettered communications can devil power. That unsettles many. Marshall G. Olsen, president of LAN\mind Training and Consulting Services, a Chicago-based LAN technology consultancy, said that he has seen resistance to networking in many companies. Managers, employees, even whole departments fear the consequences of interconnectivity. Sales departments, in particular, are often unwilling to share their data on the LAN, Olsen noted; they can be possessive of leads and figures and may kick up a fuss when senior managers talk about linking sales to, say, marketing and finance.

Sales isn't alone. Andre Hughes, manager in the networking solutions practice of Andersen Consulting, headquartered in Chicago, observes that other functions can be reluctant to share information, too. A case in point: At Applied Digital Data Systems (ADDS) Inc., a Hauppauge, N.Y.-based manufacturer of computer terminals, manufacturing managers are reluctant to share online assembly schedules with the sales department. The manufacturing side fears that aggressive sales folks—sensing opportunity in the manipulation of delivery cycles—will clamor to get clients bumped up on the schedule, perhaps at another client's expense.

Mid-level managers in large companies may also display counterrevolutionary tendencies. For good reason, according to Tobey Choate, vice president and managing director at Arthur D. Little Inc., a technology and management consulting firm based in Cambridge, Mass. The horizontal flow of information—managed by senior executives—allows organizations to cut out managers in the middle—whom Choate calls "information passers." That's the prediction Ashland Oil's Paulsen has made for his company, and many other senior executives concur.

For those anxious about the changes—both expected and unexpected—that LANs will bring, the technical hurdles to the interoperability of LANs across the enterprise are a godsend. The difficulties IS departments have linking disparate LANs and making them secure and reliable forestall the cultural, political and organizational changes to come.

But even proponents of new organizational visions ought to pause, advises PGT's Levitt. LANs signal a loss of control for all managers. "The business community doesn't have as much control over its destiny as it once had," he pointed out. "Now managers will lose control, too." CIO

DAVID DANIELS: LANS ARE NOT THE DEMONS OF CHANGE WITHIN THE ENTERPRISE; THEY ARE MERELY MESSENGERS.

PHOTO BY JOHN RAE

ENTERPRISE NETWORKING

AN INTERNAL TECHNOLOGY POLL

Getting concrete figures on technology assets is trickier—and more critical—than ever

BY THOMAS KIELY

Exactly how many PCs are sitting on desks throughout your enterprise? How many of them are linked together within departments? Across departments? What software packages run on company desktop computers—and who has responsibility for data produced by end users?

Questions such as these weren't important until recently. For years, IS departments looked upon personal computers as just another office supply, like typewriters, desks and water coolers. Departments or divisions carried the costs for PCs, so what did IS care? But now, as LANs are becoming visible—and critical—computing platforms within the enterprise, senior executives have begun to realize that these scattered assets add up to big dollars.

How many dollars, exactly, is anybody's guess.

But how can companies gauge their return on investments in technology with unclear numbers? That's the question posed by Richard J. Murray, principal at Nolan, Norton & Co., a technology-management consulting firm based in Boston. IS budgets are just a portion of IT spending in many companies. Without a clear accounting of technology costs at the grass-roots, end-user level, overall IT figures are opaque.

Murray's observations are echoed by Tobey Choate, vice president and managing director at Arthur D. Little Inc., a technology and management consulting firm in Cambridge, Mass. "Multinational companies, especially, can't tell what they are spending for IT off the [centralized] IS organization's books," Choate said. "When you don't know what you're spending on it, you don't focus on procedures needed to manage a return on it."

Some consultants and IS executives believe that the cure may be worse than the sickness. Since PCs came into the company like lamps and bulletin boards, the only way managers can get an accurate idea of how many PCs, printers and PC software packages are in use throughout the enterprise is to inventory them. (Many companies may have fixed-asset systems in place to track capital-equipment purchases, and sometimes PCs have fallen into that net—but often not consistently.) That's a huge and expensive job.

"Manually tallying up the value of what's in use is too costly," said Andre Hughes, manager in the network solutions practice of Andersen Consulting, headquartered in Chicago. "You have to look at PCs and routers, but also people, transmission costs, telecommunications usage costs—you just can't pull all that together [easily]."

ILLUSTRATION BY COCO MASUDA

A thorough inventory may also be a fool's errand. The inventory may give you precise numbers—but is there any value produced by the effort and cost of obtaining exact numbers? "Everyone has a phone system, but do you know what the return on investment of your phone system is?" asked David Daniels, senior planning consultant in the investments arm of Metropolitan Life Insurance Co., headquartered in New York. "And if the information [that] people have in their heads or desk drawers can be made accessible on a network, that has critical business value, too. So conversations about figuring out the return value of a network seem absurd."

Other companies are seeking a middle ground. At Boston-based Gillette Co., for instance, end users are responsible for their own accounting of PCs and LANs, says Patrick Zilvitis, vice president for corporate information technology. Zilvitis sets some standards and provides centralized ordering for PCs, but business units can do what they want. Business-unit managers bear the cost of their own local technology and pay for access to Gillette's global corporate network—so they do their own ROI figuring on LANs, if they think it's important.

Business units of Ashland Oil Inc., headquartered in Ashland, Ky., also control their own day-to-day IT destinies, but CIO Gaige Paulsen offers incentives as a way of tracking PC purchases. Business units can order free PCs from Paulsen. Essentially, Paulsen buys the machine out of his bud-

"WHEN YOU don't know what you're spending on IT, you don't focus on procedures needed to manage a return on it."

–Tobey Choate

get and then transfers the asset to the business unit. Of course, Paulsen only buys machines that adhere to standards necessary for corporatewide interconnections, but business units are free to buy what they want on their own.

CIOS WHO SHRUG THEIR SHOULDERS AT END-USER-computing costs are "dancing around the edges of career-limiting moves."
-Michael Millikin

But Nolan, Norton's Murray stresses that the costs of end-user computing are significant, and he urges CEOs to take a close look at what they get for their money. Hardware, software and IS support for end users may run from $2,000 to $6,000 per desktop. Those are the visible costs of end-user computing—if companies care to tally up equipment across the enterprise. There are also invisible costs: $10,000 in "peer support" (time spent by employees helping peers to grapple with applications). That means the cost of PCs can run $15,000 or more per unit—and potentially millions of dollars in aggregate. For that kind of money, CEOs ought to be asking tough questions about business returns.

CIOs ought to be asking those questions before the CEO does, said Michael Millikin, vice president of programs at Interop Co., a networking educational-services company headquartered in Mountain View, Calif. Of CIOs who shrug their shoulders at end-user-computing costs, Millikin said: "We're dancing around the edges of career-limiting moves here." It's just good standard business to know what your return on investment is.

CIOs also need to inventory what's out there to keep tabs on software. Software piracy in the company can be a real legal problem. (See "Beware the Copy Cops!" *CIO*, Nov. 1, 1992.)

Andersen Consulting's Hughes adds another reason why CIOs ought to get acquainted with the PC and LAN assets in the enterprise soon: Ignorance of the extent of networks could hamper business plans. "When IS is asked to align business requirements to [technology], it tends to think about realigning the IS organization but forgets about the network," Hughes said. Such forgetfulness can lead to dangerously misaligned strategies.

IS executives intent upon providing the most effective technology solution for a business plan will survey options, Hughes pointed out. What will this configuration cost? How about that one? What are the associated costs for these different configurations? "But most organizations have no idea what the associated value of their network is," Hughes said. How can IS executives make good decisions with faulty information?

In this era when LANs are rerouting business information within the enterprise and abetting the trend to break down walls between functions, the technology is strategic. Warns Hughes: "If something is strategic, you know the value of it." CIO

A Software Roll Call

Keeping track of software is a matter of both law and order

Launching an inventory of all the hardware components linked to networks throughout the corporation may be a headache, but tracking down and cataloging all the software applications in use on desks around the globe could be a nightmare. Imagine all the spreadsheet programs, word-processing or database packages, PC tools and utilities and games that have come in the door during the last decade!

And yet, it is important that information executives pay attention to software assets for legal reasons, says Michael Millikin, vice president of programs at Interop Co., a networking educational-services firm headquartered in Mountain View, Calif. How many applications in use inside the company are licensed—and how many are pirated? Even companies that manage their equipment assets may ignore software, since applications don't fall into the capital-expense barrel.

One solution: Comdisco Inc., of Rosemont, Ill., offers an EDI-based asset-management package that will track anything, even the chairs underneath end users. For a price, Comdisco consultants will even manage that much-dreaded inventory.

-T. Kiely

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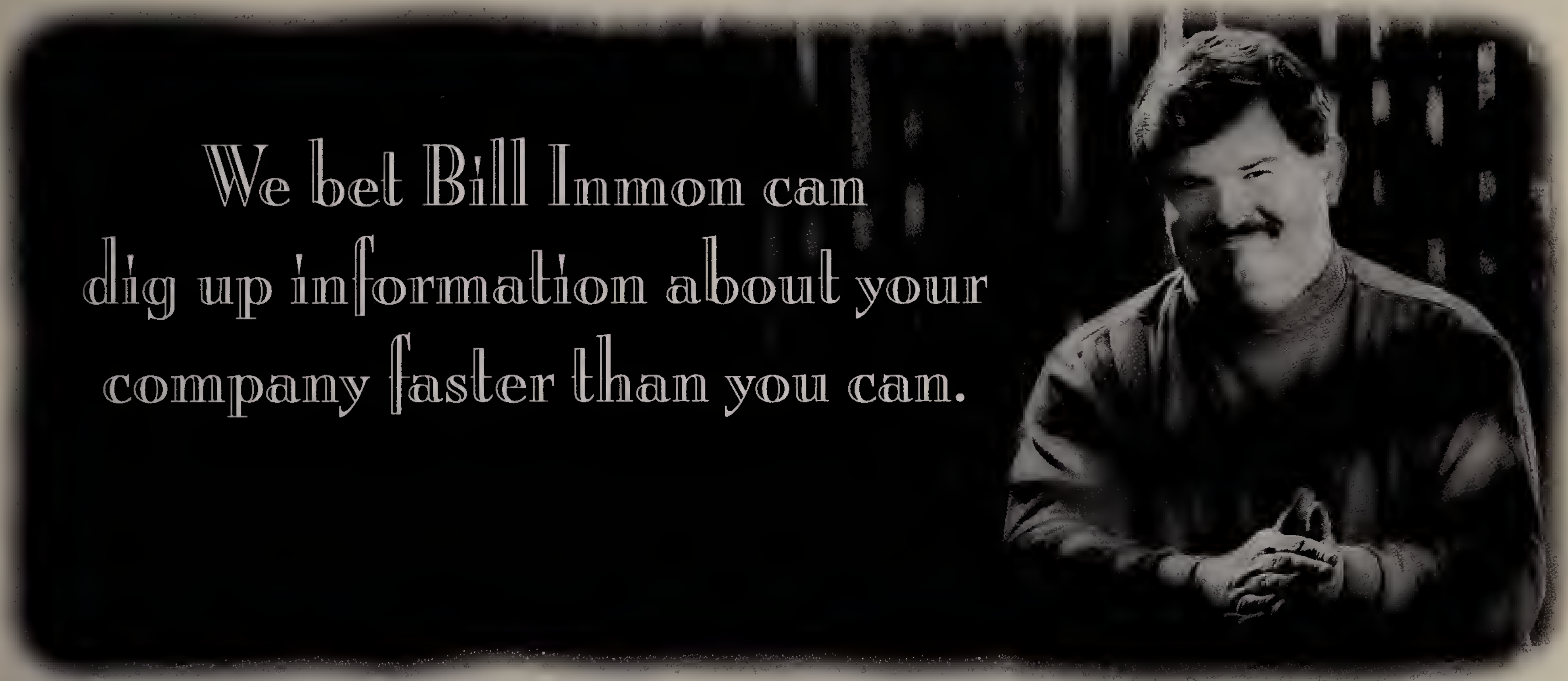
We bet Bill Inmon can
dig up information about your
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Bill Inmon, creator of the data warehouse.

Never doubt the resourcefulness of a person like Bill Inmon.

Bill's made a career out of quickly uncovering vital business information that takes even the sharpest data managers months to find.

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Informed Decisions Based On Reliable Information

The need for integrated, historical information has never been greater. But today's operational databases weren't designed for information processing. Typically, data is stored in various applications on several databases. So converting raw data into usable information takes forever.

A data warehouse, on the other hand, stores data in a single, integrated informational database. So you can get quick responses to your information requests and have a clear picture of overall business activity.

A Historical Perspective Of The Future

Unlike data in the operational environment, which is routinely updated and purged, information in a data warehouse is stored as a series of "snapshots" of operational activity. These snapshots can provide years of integrated historical information which make analyzing business trends and statistics much easier. Without such a perspective, accurate forecasting is virtually impossible.

The Fast Track To Integration

Building a data warehouse manually is likely to take longer than you can afford to wait. Unless, of course, you use Bill's shortcut.

PRISM Warehouse Manager automates the entire building process. Data is automatically extracted, summarized and restructured to load the data warehouse in either a mainframe or a client server environment.

PRISM also offers on-site consulting, capacity planning and PRISM Generic Data Models™ which eliminate the time-consuming task of developing a custom data model.

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Warehouse Manager won't disrupt operational activity. It simply scans and copies information before moving it into the data warehouse. Data sweeps are conducted when processing activity is minimal and take just minutes to complete, depending on file sizes.

Once installed, a data warehouse functions independently of the operational environment. And with Warehouse Manager's Metasource,™ information is easy to organize and maintain.

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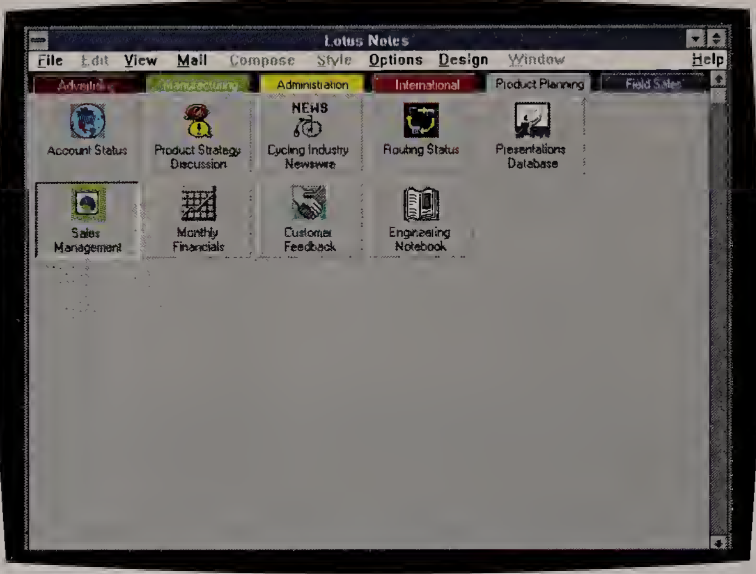
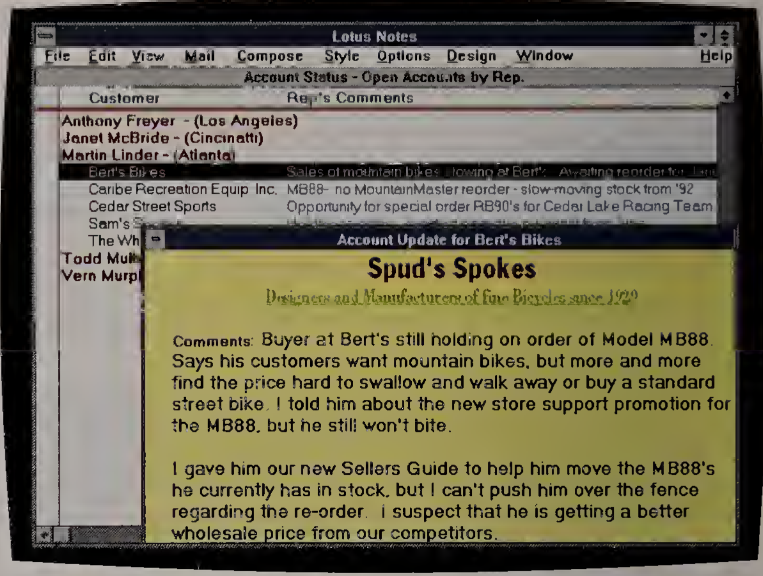


1. This is Michelle's Notes desktop. Each icon represents a different Notes application. She uses these to work with people all over the world including the field sales team, manufacturing, engineering, R&D, key customers and senior management. She regularly scans activities in the field by double clicking on ACCOUNT STATUS.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help

Account Status - Open Accounts by Rep.

Customer — Rep's Comments

Anthony Freyer - (Los Angeles)
Janet McBride - (Cincinatti)
Martin Linder - (Atlanta)
Bert's Bikes — Sales of mountain bikes slowing at Bert's. Awaiting reorder for
Caribe Recreation Equip Inc. — MB88- no MountainMaster reorder - slow-moving stock from '92
Cedar Street Sports — Opportunity for special order RB90's for Cedar Lake Racing Team
Sam's
The Wh
Todd Mul
Vern Murp

Account Update for Bert's Bikes

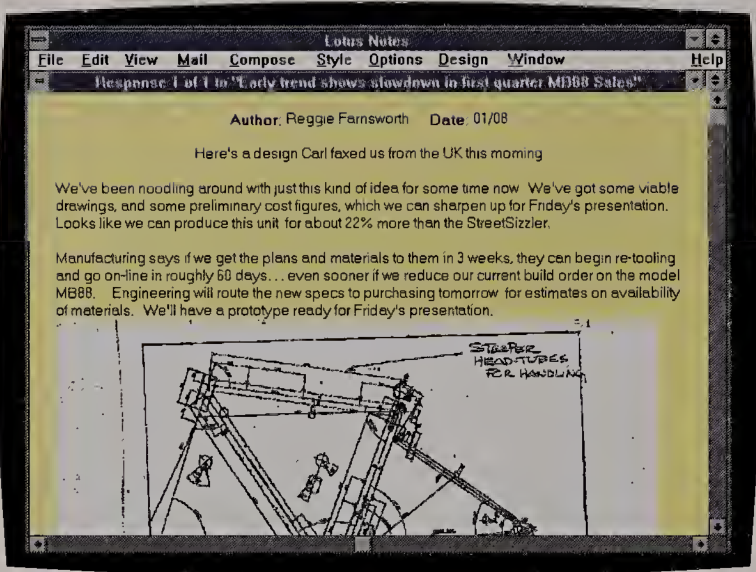
Spud's Spokes

Designers and Manufacturers of fine Bicycles since 1929

Comments: Buyer at Bert's still holding on order of Model MB88. Says his customers want mountain bikes, but more and more find the price hard to swallow and walk away or buy a standard street bike. I told him about the new store support promotion for the MB88, but he still won't bite.

I gave him our new Sellers Guide to help him move the MB88's he currently has in stock, but I can't push him over the fence regarding the re-order. I suspect that he is getting a better wholesale price from our competitors.

2. Today, she notices a number of entries regarding a slow-down in closing first quarter reorders for their most popular model, the MountainMaster off-road bike. It seems the market for this high-priced bike is beginning to dry up. This could be a major problem.


Lotus Notes
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STEEPER HEAD-TUBES FOR HANDLING

Response 1 of 1 to "Early trend shows slowdown in first quarter MB88 Sales"

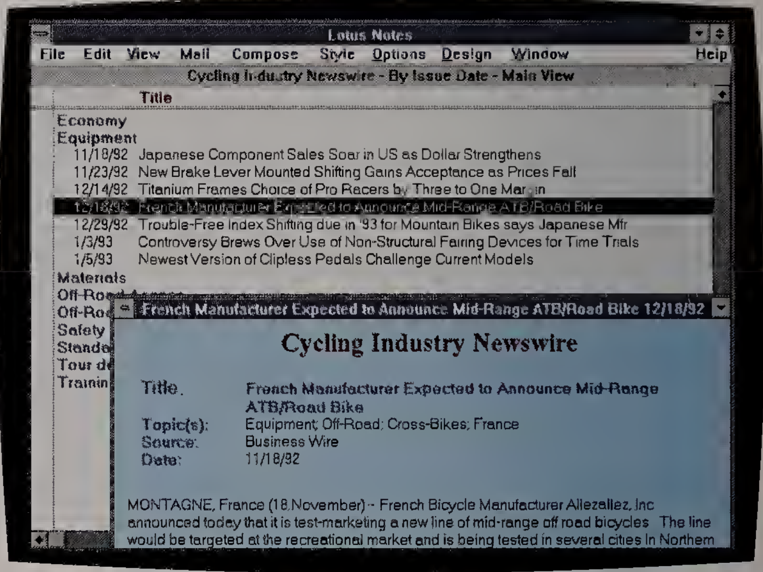
Author: Reggie Farnsworth **Date:** 01/08

Here's a design Carl faxed us from the UK this morning

We've been noodling around with just this kind of idea for some time now. We've got some viable drawings, and some preliminary cost figures, which we can sharpen up for Friday's presentation. Looks like we can produce this unit for about 22% more than the StreetSizzler.

Manufacturing says if we get the plans and materials to them in 3 weeks, they can begin re-tooling and go on-line in roughly 60 days... even sooner if we reduce our current build order on the model MB88. Engineering will route the new specs to purchasing tomorrow for estimates on availability of materials. We'll have a prototype ready for Friday's presentation.

5. The next morning she checks into the DISCUSSION database and this time finds an entry from Reggie in R&D. Reggie had also read Jim's message and is responding with a possible solution his people have been playing with. He pastes in an autocad illustration faxed to him from the U.K. using a Notes incoming fax gateway.


Lotus Notes
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Cycling Industry Newswire - By Issue Date - Main View

Title

Economy
Equipment
11/18/92 Japanese Component Sales Soar in US as Dollar Strengthens
11/23/92 New Brake Lever Mounted Shifting Gains Acceptance as Prices Fall
12/14/92 Titanium Frames Choice of Pro Racers by Three to One Margin
12/18/92 French Manufacturer Expected to Announce Mid-Range ATB/Road Bike
12/29/92 Trouble-Free Index Shifting due in '93 for Mountain Bikes says Japanese Mfr
1/3/93 Controversy Brews Over Use of Non-Structural Fairing Devices for Time Trials
1/5/93 Newest Version of Clipless Pedals Challenge Current Models
Materials
Off-Ro
Off-Ro
Safety
Stande
Tour d
Trainin

French Manufacturer Expected to Announce Mid-Range ATB/Road Bike 12/18/92

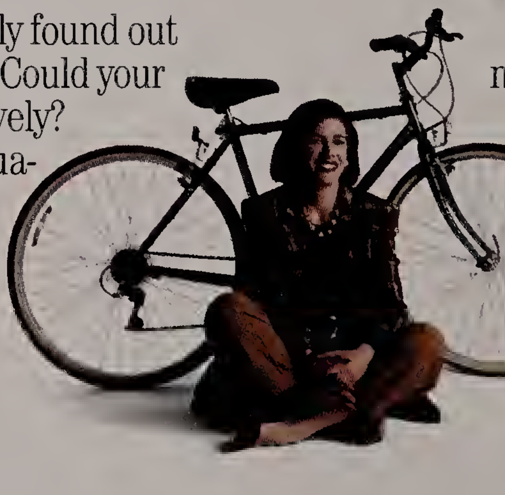
Cycling Industry Newswire

Title: French Manufacturer Expected to Announce Mid-Range ATB/Road Bike
Topic(s): Equipment; Off-Road; Cross-Bikes; France
Source: Business Wire
Date: 11/18/92

MONTAGNE, France (18 November) -- French Bicycle Manufacturer Allezallez, Inc announced today that it is test-marketing a new line of mid-range off road bicycles. The line would be targeted at the recreational market and is being tested in several cities in Northern

6. With a presentation on Friday, Michelle gets down to some quick market research by opening up the CYCLING INDUSTRY NEWS database. An organized source of live industry data, it provides a news report on a French company that has a couple months head start developing a hybrid bike.

To see how fast you
Lotus Notes, just wat



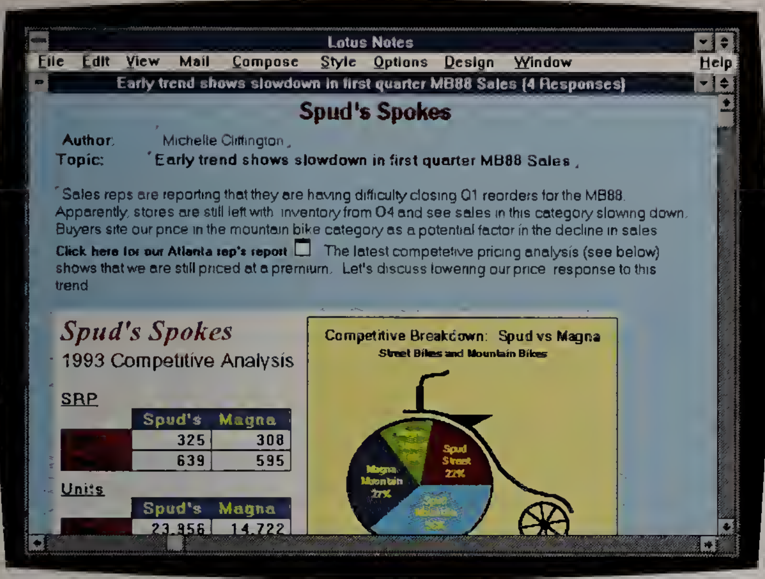
What would you do if you suddenly found out that your key product was in trouble? Could your organization react quickly and effectively?

We've chosen this as an ideal situation to demonstrate the power of Lotus Notes.® See how Notes improves business performance by accelerating processes and helping people work together more effectively.

Michelle Cliffington is a product manager for a bicycle manufacturer. She's responsible for all product planning, market research and marketing activities for her product line. Notes helps her shift gears and rush a new product to market.

See how she accesses, tracks, shares and organizes

In Canada, call **1-800-GO-LOTUS**. ©1993 Lotus Development Corporation, 55 Cam


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Early trend shows slowdown in first quarter MB88 Sales (4 Responses)
Competitive Breakdown: Spud vs Magna
Street Bikes and Mountain Bikes
Spud Street 22%
Magna Mountain 27%

Spud's Spokes

Author: Michelle Ciffington

Topic: Early trend shows slowdown in first quarter MB88 Sales

Sales reps are reporting that they are having difficulty closing Q1 reorders for the MB88. Apparently, stores are still left with inventory from Q4 and see sales in this category slowing down. Buyers site our price in the mountain bike category as a potential factor in the decline in sales

Click here for our Atlanta rep's report ☐ The latest competetive pricing analysis (see below) shows that we are still priced at a premium. Let's discuss lowering our price response to this trend

Spud's Spokes

1993 Competitive Analysis

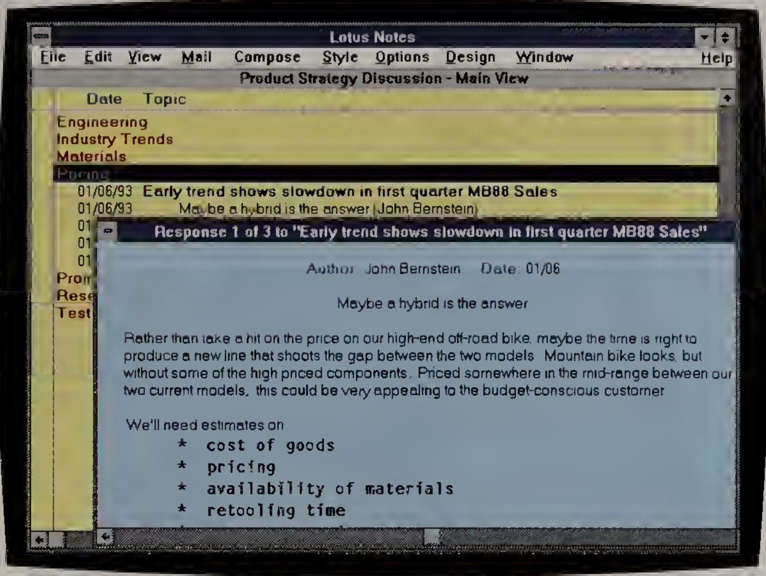
SRP

	Spud's	Magna
	325	308
	639	595

Units

	Spud's	Magna
	23,956	14,722

3. She decides to recommend a price-reduction and double clicks into the STRATEGIC PRODUCT DISCUSSION database. This provides an organization-wide forum to discuss issues and brainstorm solutions. She links the report from the Atlanta rep directly into her Notes document. Then she uses DDE to embed some 1-2-3® charts into her document as well.


Lotus Notes
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Product Strategy Discussion - Main View

```
Date      Topic
Engineering
Industry Trends
Materials
Pricing
  01/06/93  Early trend shows slowdown in first quarter MB88 Sales
  01/06/93      Maybe a hybrid is the answer (John Bernstein)
  01
  01
  01
Prom
Rese
Test
```

Response 1 of 3 to "Early trend shows slowdown in first quarter MB88 Sales"

Author: John Bernstein Date: 01/06

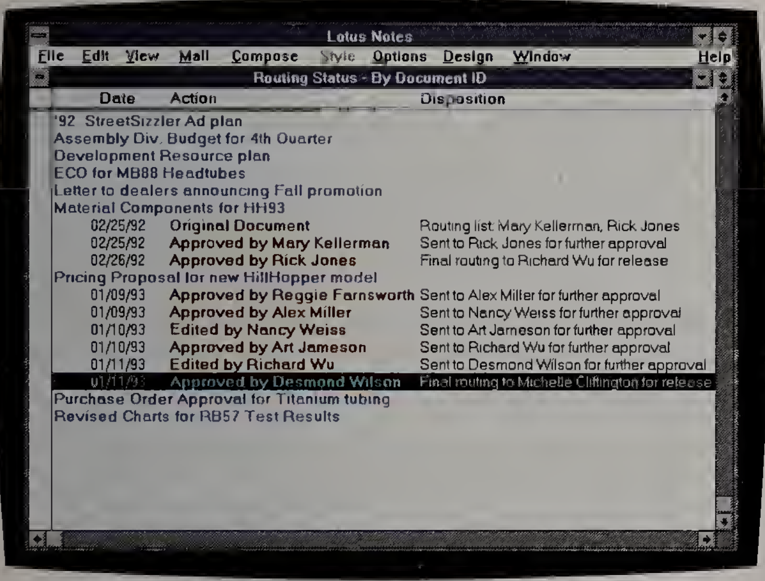
Maybe a hybrid is the answer

Rather than take a hit on the price on our high-end off-road bike, maybe the time is right to produce a new line that shoots the gap between the two models. Mountain bike looks, but without some of the high priced components. Priced somewhere in the mid-range between our two current models, this could be very appealing to the budget-conscious customer

We'll need estimates on

- cost of goods
- pricing
- availability of materials
- retooling time

4. Later in the day she re-enters the DISCUSSION database looking for responses. Her boss, John, has logged on from his hotel room in San Francisco. Rather than cut the margin, he suggests she explore the feasibility of adding a mid-priced bike to their line. He wants an initial presentation for Friday.


Lotus Notes
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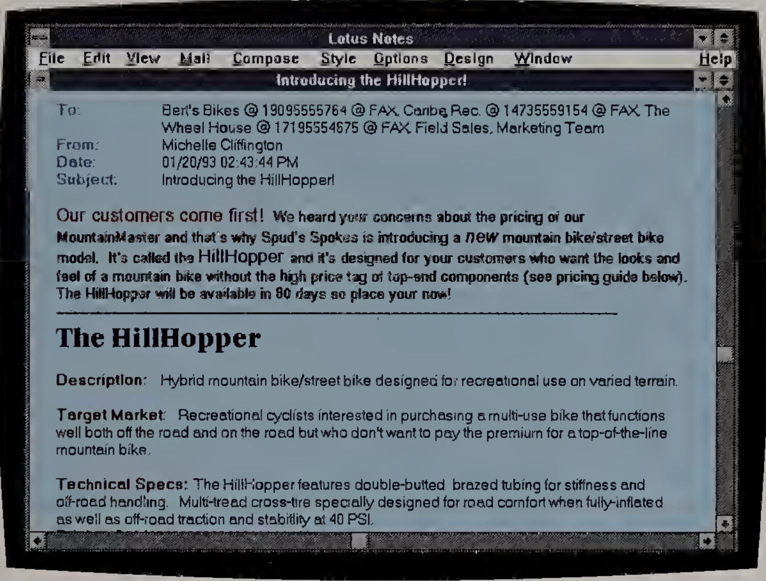
Routing Status - By Document ID

```
    Date      Action                        Disposition
'92 StreetSizzler Ad plan
Assembly Div. Budget for 4th Quarter
Development Resource plan
ECO for MB88 Headtubes
Letter to dealers announcing Fall promotion
Material Components for HH93
    02/25/92  Original Document             Routing list: Mary Kellerman, Rick Jones
    02/25/92  Approved by Mary Kellerman    Sent to Rick Jones for further approval
    02/26/92  Approved by Rick Jones        Final routing to Richard Wu for release
Pricing Proposal for new HillHopper model
    01/09/93  Approved by Reggie Farnsworth Sent to Alex Miller for further approval
    01/09/93  Approved by Alex Miller       Sent to Nancy Weiss for further approval
    01/10/93  Edited by Nancy Weiss         Sent to Art Jameson for further approval
    01/10/93  Approved by Art Jameson       Sent to Richard Wu for further approval
    01/11/93  Edited by Richard Wu          Sent to Desmond Wilson for further approval
    01/11/93  Approved by Desmond Wilson    Final routing to Michelle Cliffington for release
Purchase Order Approval for Titanium tubing
Revised Charts for RB57 Test Results
```

7. A few days after routing her proposal to the product team, she wants to find out where it stands within the organization. She opens the ROUTING STATUS application to find that it has worked its way through the organization to Desmond, the senior decision-maker, and has been finally approved. So she's on her way.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Introducing the HillHopper!

To: Bert's Bikes @ 19095555764 @ FAX, Caribe Rec. @ 14735559154 @ FAX, The Wheel House @ 17195554675 @ FAX, Field Sales, Marketing Team
From: Michelle Cliffington
Date: 01/20/93 02:43:44 PM
Subject: Introducing the HillHopper!

Our customers come first! **We heard your concerns about the pricing of our MountainMaster and that's why Spud's Spokes is introducing a *new* mountain bike/street bike model. It's called the HillHopper and it's designed for your customers who want the looks and feel of a mountain bike without the high price tag of top-end components (see pricing guide below). The HillHopper will be available in 60 days so place your now!**

The HillHopper

Description: Hybrid mountain bike/street bike designed for recreational use on varied terrain.

Target Market: Recreational cyclists interested in purchasing a multi-use bike that functions well both off the road and on the road but who don't want to pay the premium for a top-of-the-line mountain bike.

Technical Specs: The HillHopper features double-butted brazed tubing for stiffness and off-road handling. Multi-tread cross-tire specially designed for road comfort when fully-inflated as well as off-road traction and stability at 40 PSI.

8. Michelle closes the loop by communicating the news to their customers. Double clicking into the CUSTOMER FEEDBACK database, she faxes a memo directly from Notes to all retailers. In it she explains that the company has heard their problems and responded with the Hill Hopper. And with delivery in 60 days, they can order now.

can respond with
h Michelle shift gears.

information in ways never before possible. How effortlessly people use Notes to respond and move the project forward.

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ENTERPRISE NETWORKING

GOVERNING THE MULTIPARTY SYSTEM

Supporting a range of computers and networks requires a multiplicity of management systems (plus the technicians to operate them) and a great deal of resourcefulness. Still, there are often solid business reasons to enable and support IT diversity.

BY ABBIE LUNDBERG

As enterprise networking becomes more pervasive, corporations whose departments have purchased end-user equipment autonomously are hard-pressed to connect and manage an increasingly diverse array of computing assets. In such environments, operations that ought to be simple—say, mailing a text document to a colleague in a different department—turn out to be frustratingly complicated. Worse, information that might be of strategic importance to activities companywide often remains isolated within the department that generates it.

Despite the difficulties, many corporations find there are solid business reasons to allow and support some degree of IT diversity. Independent business units have different goals, and their technology needs can differ radically. Enabling them to select the best technology for their specific purposes can help them to get their products to market faster or to be more responsive to customer needs. On the other hand, unless their lines of business have nothing in common at all, the ability to share data is often critical as well. Many organizations are trying to find a middle ground between enabling diversity and maintaining control. Generally, this means setting some standards within platforms.

But even this doesn't solve all problems. Because mainframes, minicomputers and local area networks have no common dialect, connecting them requires products such as gateways and middleware to act as translators. Moreover, each type of computer requires its own set of management tools and the technicians to run them. The wider the range of computers and networks a company supports, the more technicians it needs.

While microcomputer hotshots may be able to oversee departmental LANs, they quickly discover that navigating through the assortment of equipment that connects a LAN to a mainframe (in a simple case, it would be a local server, a router, a T1 line, a second router and a front-end processor) is too complicated. Many corporations want to make such tasks simpler. "Having spent millions of dollars on their computers and networks, companies now are focusing on how to have their systems work together better," said Jack Martin, president of Bridgeworks Integration Inc., a Houston-based network-integration firm.

The degree of standardization being mandated varies from company to company. Firms with discrete lines of business are generally willing to trade some of the efficiencies of complete standardization for the improved business results made possible by diversity. In these cases, central IS is charged with supporting a variety of computers and networking environments. Highly centralized organizations usually require the most compliance, with users offered one take-it-or-leave-it selection (see "A Democratic Reform Movement," Page 66). This makes it possible to keep a lean management staff, and exchanging information among departments is simple.

HARRY TOMPKINS SAYS DEPARTMENTS "ARE FREE TO PURCHASE NONSTANDARD EQUIPMENT, BUT OUR SUPPORT FOR THOSE DEVICES IS LIMITED."

PHOTO BY KENT HANSON

Ciba-Geigy Corp., a manufacturer of pharmaceuticals, chemicals and vision-care products in Ardsley, N.Y., falls into the first category. Ciba-Geigy "has lines of business that have little in common with one another," said Stanley Sherman, CFO and vice president of finance and information services, "so it makes no sense to try to have them all use only one type of computer equipment." The company supports Digital Equipment Corp. VAXes, which run DEC's VMS operating system and support DEC's DECnet protocol; IBM mainframes, which run MVS and support the System Network Architecture (SNA) protocol; servers running IBM's LAN Server operating system, which runs on OS/2 and uses IBM's NetBIOS protocol in a token-ring environment; Novell Inc.'s NetWare, which uses the Integrated Packet Exchange (IPX) protocol; and Unix workstations, which run various versions of Unix and work with the Transmission Control Protocol/Internet Protocol (TCP/IP).

Such diversity presents serious technical challenges. At the top of the list is network management. Theoretically, a network technician should be able to sit at one terminal and sift through management information generated by different devices to determine the source of a problem. In reality, such systems do not yet exist, and each network management system is only able to interrogate one type of equipment. A technician often works with a dozen systems, moving from one to another in order to pinpoint problems. For instance, he or she might first test the SNA segment of the connection, then the DECnet portion and then even the NetWare LAN. Each test has to be done separately and can take from minutes to hours to complete. The more computers a company supports, the more management systems enter the equation and the more difficult becomes the technician's job.

To ease network administration, Ciba-Geigy has tried to establish corporate networking standards wherever possible, according to Harry Tompkins, manager of

MANY ORGANIzations are trying to find a middle ground between enabling diversity and maintaining control. Generally, this means setting some standards within platforms.

ENTERPRISE NETWORKING

AT BANKERS Trust, the goal has been to strike the right balance between offering business units the best technology for their individual needs and maintaining a coherent environment.

E Pluribus Unum

At Bankers Trust, the needs of the many are met by the few

In the mid-1980s, deregulation opened a Pandora's box of possibilities within the banking industry. Bankers Trust, a global wholesale bank headquartered in New York, decided to move application development out to the business units. Knowing the anarchy that complete decentralization could bring, Bankers Trust spent a year writing a detailed set of standards for its technology architecture. These standards specify hardware platforms, system software, network protocols, programming languages—everything related to what can be used to build systems and how to proceed.

Bankers Trust has a single worldwide E-mail system and a single worldwide telecommunications network, and it keeps a tight rein on local area networking as well. "Right from the start, we had pretty clear and somewhat restrictive standards on what kinds of PCs you could buy," said Michael Packer, managing director of IS. "There was always a single networking approach for local area networks, not just in terms of what brand names of software you could buy, but generally how you connected them together, how they're integrated."

Within the standards set, the central group tries to be responsive. "The needs of the businesses [are] different," said Packer, "and therefore the groups that operate as a utility on behalf of everyone, like telecommunications, as well as the people who set the standards, had darn well better be responsive to those different needs." Differing needs, after all, are what drove the move to decentralization in the first place. With application development embedded in business units whose dynamics are extremely diverse, that also means providing more than "just one platform for major computing.... Some of our businesses are extraordinarily high-volume. Others are lower-volume but have a greater need for flexibility." Host systems are DEC VAXes and IBM mainframes; Intel-based PC servers run OS/2; clients run Windows; and the overwhelming majority of its LANs are Novell NetWare, with a few Pathworks LANs to get to the VAX host.

To ease communication among applications on different platforms, Bankers Trust built its own middleware. With middleware, "programmers don't have to know or care what platform they are writing on or to [in order] to make connectivity happen. For file transfers or message exchange or any other kind of communication, no matter what platform you're trying to get to, you do it with the same API [application program interface]."

MICHAEL PACKER: COMPLEX BUSINESS REQUIREMENTS DICTATE THE NEED FOR MULTIPLE SYSTEMS.

PHOTO BY KENT HANSON

At Bankers Trust, the goal has been to strike the right balance between offering business units the best technology for their individual needs and maintaining a coherent environment. "With the rapid pace of change in computer technology, I don't foresee a time when one type of computer system and network could support all of the requirements at a company as large and complex as Bankers Trust," Packer said, "[but] our tenet is 'as few as possible.' "

–A. Lundberg

telecommunications services. It offers departments guidelines, which are arrived at by consensus, recommending that they use Synoptic Inc. wiring hubs and Cisco Inc. routers. Eventually, the company plans to phase out use of IBM's LAN Server operating system and standardize on Novell NetWare.

In keeping with the decentralized mentality, the selection of standards requires corporate consensus, and all departments have input. This approach has pluses and minuses. "Because so many groups are involved, decisions often take a long time to make," said Sherman. Still, he believes, "the decisions are better because more issues are raised than when only one group examines a problem."

Even when standards are decided upon, a business unit is free to deviate: A few departments purchased IBM 6611 routers rather than Cisco's products. But there is a price to pay for such deviation. "Departments are free to purchase nonstandard equipment, but our support for those devices is limited," said Tompkins. Because the company already has such a complex web of equipment and management systems, the task of supporting anything new falls to the department making the purchase.

A few large companies have adopted a more structured approach to selecting LANs. "When LANs were introduced, we understood that eventually they would be connected to our other computer systems, and we established a set of guidelines," noted Marc Dodge, telecommunications manager at United Parcel Service Inc. in Mahwah, N.J. In 1987, UPS determined that departments would use token-ring networks running Novell NetWare. The company has not deviated from the policy in deploying 1,400 LANs.

Dodge listed many efficiencies attributable to compliance with standards. Linking LANs to LANs and LANs to mainframes is relatively simple because the company uses only two network protocols: Novell's IPX and IBM's SNA. Personnel costs are low because UPS does not have to hire new technicians when new LANs are implemented. End-user training has been made simpler because the company can use a cookie-cutter approach to teaching users how to operate their computers.

Keeping LANs under control has been a constant battle for Dodge. "Application developers always think that they are the exception to the rule and their application can only run on a different type of computer," Dodge said. In such cases, Dodge's organization conducts an analysis to determine how much it would cost to build the application on a new system.

"Many companies are content with soft savings from their LANs and do not look closely at hidden costs," he explained. "We don't have that attitude, and cost-justify everything. In one case, we examined how much it would cost to train employees to use, and technicians to troubleshoot, a new LAN operating system. The numbers just blew away the savings that the department thought it would receive by running the application on another computer."

Standards do not solve all management problems, however. Last year, UPS began searching for an integrated network-management system that would provide some central control of its network while leaving major portions of it decentralized and in the hands of users. The first stages of the project—the prototypes for the local, distributed parts—are expected to be in

MARC DODGE: UNDER CLOSE COST-JUSTIFICATION SCRUTINY, SOME PROMISED SAVINGS OF A NEW SYSTEM VANISHED.

PHOTO BY KENT HANSON

place by June. The wide area network piece should be in place by September. "Even though we work with limited types of equipment, it is still difficult to find a central management system," Dodge said. "I don't know how companies with many types of LANs can find one."

"WE UNDERSTOOD THAT END USERS WOULD NOT WANT to become involved in managing a nationwide network, so we selected equipment that could be overseen from a central location."
-Trav Waltrip

The Travelers Cos., in Hartford, Conn., also took a proactive approach in setting LAN standards. "In the middle 1980s, it was clear to us that LANs would become a key component of our computer systems," noted Trav Waltrip, vice president of telecommunications at the insurance company. "We wanted to make sure that we were prepared for them and outlined company standards." Without standards, Waltrip explained, network management would be onerous at best. And, as at UPS, there were no conflicting business reasons to argue against the imposition of standards.

TRAV WALTRIP: THE ECONOMIES OF SCALE ENABLED BY STANDARDIZATION PROVIDE A COMPETITIVE EDGE.

Travelers had made a substantial investment in developing a homegrown network-management system that ran on an IBM mainframe under a token-ring architecture. So the company went with token ring (and IBM's LAN Server operating system) for its LANs as well. The company has enhanced its network-management system so network engineers in Hartford can manage physical connections, disk space and backup of remote LANs across the country. "We understood that end users would not want to become involved in managing a nationwide network, so we selected equipment that could be overseen from a central location," Waltrip explained.

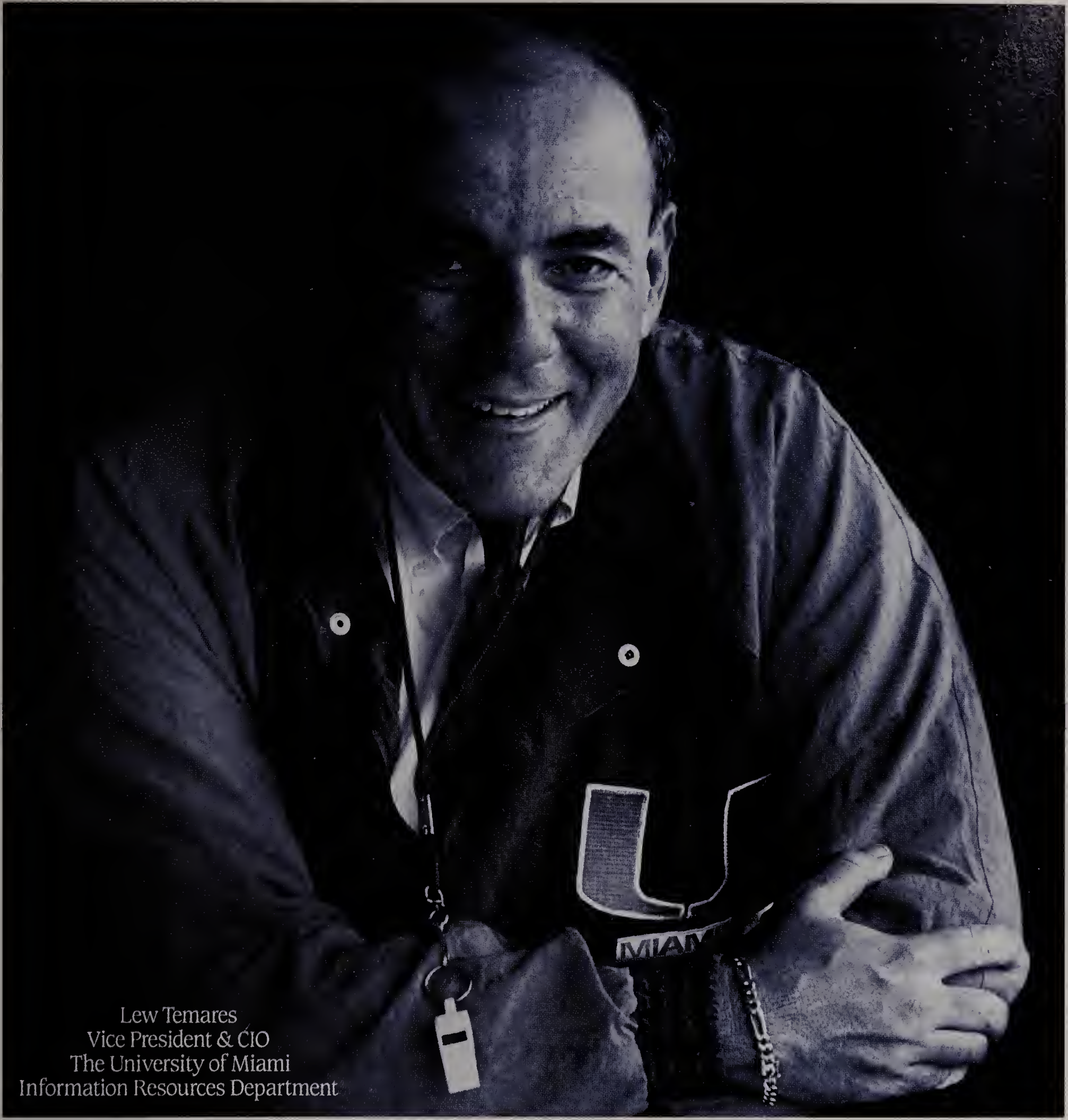
Cost savings is one benefit from the decision. "Corporations always try to take advantage of economies of scale," Waltrip noted. "If a company supports a variety of LANs and needs a number of different management systems, then there are no such economies. We conducted studies and concluded that our computing services cost less than our competitors' services. A major reason is that our systems are more integrated and easier to manage than competitors' systems."

Like other companies, Travelers is exploring Unix servers, but this decision was again driven by network-management considerations. "A few departments are building applications that run on the IBM RS/6000," Waltrip said. "We allowed that selection because those workstations are compatible with our central management system."

Travelers believes that standardization will bring other benefits. "The industry is moving to client/server computing," Waltrip explained. "These applications are complex. Companies with a wide range of computer equipment will have great difficulty deploying them."

Observers agree with that perception and anticipate that companies in all industries will gradually begin to narrow the diversity of their computer equipment. "Microcomputers moved corporate computing decision-making from MIS departments to end users," noted Bridgeworks' Martin. "Now the pendulum is swinging back to central MIS departments." CIO

PHOTO BY LANNY NAGLER



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ENTERPRISE NETWORKING

PROFILE

A DEMOCRATIC REFORM MOVEMENT

Florida Power is using information technology to prepare for the trials of deregulation

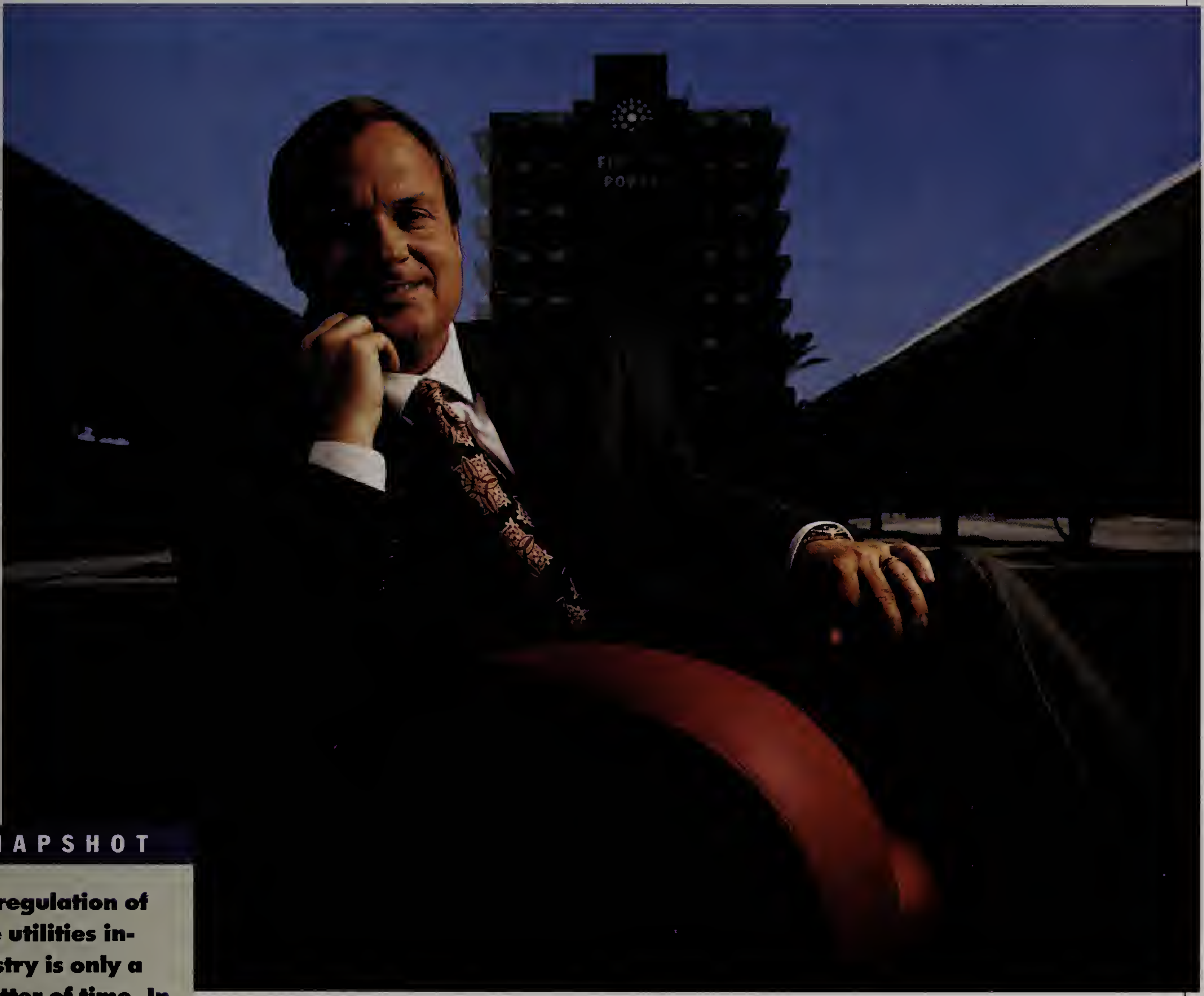
BY ABBIE LUNDBERG

The threat of efficient, low-cost competition within the utilities industry is driving traditional power companies to lower their own costs, provide new services and greatly improve customer service. To achieve these goals, Florida Power Corp., headquartered in St. Petersburg, Fla., has begun the process of rebuilding its information systems into a cooperative architecture of Unix-based LANs and WANs incorporating a range of technologies.

Current regulations within the utilities industry permit non-regulated power producers to generate electricity and sell it to the utilities. Under the new national energy policy, there is also pressure for utilities to give these smaller, more nimble competitors access to transmission facilities, so they can move their electricity from place to place. "Ultimately," said James Pollard, director of information services, "what we have to ask ourselves is, if they can generate it and they can transmit it, why can't they just sell it to the customer?" This question is forcing traditional power companies to reexamine their role and their relationships with their customers.

Over the years, Florida Power's business-unit computer systems had been selected independently of one another, and they had little or nothing in common. The lack of technological integration became a serious issue as data began moving away from mainframes to LANs. "Employees in one department were generating data that could be useful to workers in other groups, but there was no way to make that data available to them," noted Pollard. "LANs are changing the computer equation. They're too complicated and too important to business operations for corporations to continue running them in an incohesive fashion."

The decision to bring the systems into line came out of the company's strategic planning process. Three years ago, "with the storm clouds on the horizon for deregulation in our industry," CEO and President Allen J. Keesler Jr. convened a high-level executive group to assess the situation and determine what Florida Power needed to do to remain competitive, Pollard said. The executives identified six key strategic areas for the corporation, including "the use of information technology to help reshape how we do business and how we compete." The commitment to rebuild the



JAMES POLLARD: "LANs ARE TOO COMPLICATED AND TOO IMPORTANT TO BUSINESS OPERATIONS TO CONTINUE RUNNING THEM IN AN INCOHESIVE FASHION."

PHOTO BY DOUGLAS JOHNS

SNAPSHOT

Deregulation of the utilities industry is only a matter of time. In order to keep up with smaller, more flexible competitors, traditional utilities must become more responsive themselves. To that end, Florida Power is building a cooperative computer architecture that will give employees universal, easy access to corporate data and computing power.

technology architecture was real; to pull it off, the company added $64 million to its existing five-year budget for IT.

A central technology-evaluation group was formed to determine which technologies to rely on, and it quickly decided that open systems were the wave of the future. "We're trying to integrate a whole bunch of disparate platforms, [and] conventional LAN systems...are not going in that direction," Pollard said. For that reason, the group chose a Unix-based LAN product from Hewlett-Packard Co. "Proprietary products had gotten us into the situation we were in, and we wanted to get out," explained Systems Analyst Ted Kimer.

With over 90 NetWare LANs in place, deciding to move from Novell to Unix was a major step. "There's nothing wrong with Novell," said Pollard; "they're doing some great things.... In fact, the product we're selecting may be weaker in terms of how rigorous it is, but we've got to make do with that to do this kind of universal network that we're trying to build."

The new architecture is a large network where all of the devices "know who they are, what they do and where they can go to get whatever else it is they need," said Pollard. "In this environment, the traditional mainframe just happens to be the largest of the servers that are nodes on the network." Mid-range systems and smaller end servers are also scattered across the network. To enable integration and cooperative processing, Florida Power looked for "the pieces of communications software that represent a common denominator of all the architectures that we have to interconnect one to another."

ENTERPRISE NETWORKING

Power from the People

A new system to collect and manage customer information will forever alter consumer relations at Florida Power and pave the way for the delivery of new services

Customer service at Florida Power Corp. is about to be transformed. When its new customer-information system is up and running, powerful desktop machines will be able to identify and extract information from all the data repositories across the network in order to perform a given transaction.

JAMES POLLARD, DIRECTOR OF INFORMATION SERVICES

PHOTO BY DOUGLAS JOHNS

"The touch of a button may simultaneously execute three messages going to three different platforms in three physical locations," explained James Pollard, director of information services. The application will "get that data and bring it back and aggregate it into a single transaction from the user perspective."

The system, which is being developed in conjunction with Andersen Consulting, is easy to use. "Everything is in English; everything is intuitive; you've got multiple levels of help in front of you," said Pollard. Training time is cut dramatically, and "those very infrequent and uncommon and very complicated transactions that only one person who's been in the office 17 years knows how to do are now available to everybody, because this system will walk them through."

To illustrate the power of the system, Pollard gave the example of a customer calling with a complaint about a high bill. "They've been working on their bill for an hour and a half, and they've done all the extensions, and they want to talk about it," he said. Previously, a representative would have to pull out a copy of that account and try to catch up with the customer. With the new system, all of the analysis will be done at the workstation instantaneously. "The trends, the graphs, everything is given to that representative," said Pollard. "It's going to shade and highlight and color in areas that may be troublesome. If there's an error...it will point it out."

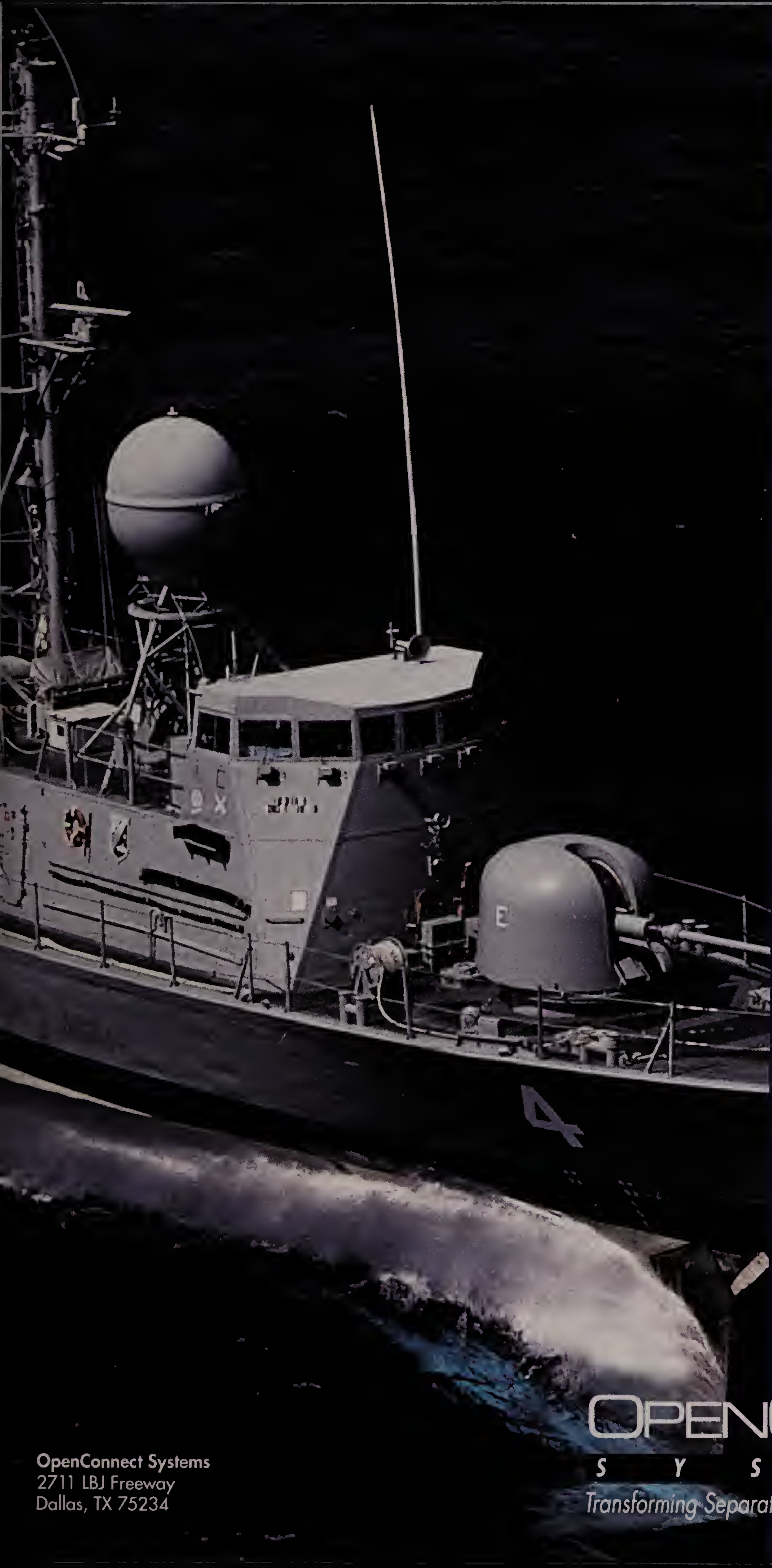
Once the issue is resolved, a keystroke will download the data from the account record into a spreadsheet, trigger a standard word-processing program on the desktop, formulate a letter detailing the transaction to the customer and send the letter to a printer.

"But even if you get that job done and you satisfy the customer that the bill's correct, he's still not necessarily the happiest customer in the world," Pollard pointed out. At any time during the course of transaction, the representative can press a key that will prompt the system to do a background analysis matching the customer's usage profile to the company's conservation programs. When the analysis is done, a screen will pop up suggesting that a particular program could help reduce the customer's consumption and cut their overall bill. "Now you've taken a complaint call and you've turned it into an opportunity to help them save money on their account," Pollard said.

If the customer wants more information about the program, the system will alert someone in the conservation-services office that they've "got an appointment to call this customer, and [it will provide] a facsimile of everything we've sent to the customer so they know what's going on."

Once deregulation occurs, Pollard believes, utilities will have to provide the same level of service consumers are used to receiving in other areas of their lives. In effect, he said, Florida Power will be competing not just with other energy producers but with such paragons of customer service as Land's End as well.

–A. Lundberg



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TECHNICAL PROFILE

Florida Power Corp., a $1.8 billion firm headquartered in St. Petersburg, Fla., provides power to businesses and residential customers in a 32-county, 22,000-sq.-mile service area in central Florida and employs 5,800 people.

Current Computer Systems: Hitachi Data Systems mainframes at the main office complex with 700 3270 devices; Digital Equipment Corp. VAX/VMS minis at major WAN sites; Hewlett-Packard Co. UX Unix servers currently replacing 90 Novell LANs throughout the service area. Workstations are mainly Dell 486 machines running Windows, with some Sun SparcStation machines for niche applications.

Networking: Ethernet LANs connected via routers and fiber-optic cabling into high-speed campus nets. WAN is designed as a ring, providing fault-tolerance and redundancy for all major campuses connected to it. Smaller sites will be connected using point-to-point spurs off the major ring and may include company-owned or common-carrier leased services.

Problem: Need to integrate three islands of automation (mainframe host system, departmental mini systems and PC LANs) created a multi-protocol network that is complex and difficult to manage and limits capabilities for file, print and application access. The lack of a common network protocol suite requires the use of gateways and specialized servers to support interoperability.

Solution: The company is embracing open systems as the enterprisewide network architecture. Initial implementation will include the use of TCP/IP as the single protocol suite, with eventual migration to the Open Systems Interconnect protocol family. Initially, only the Novell LANs will have to be replaced.

Data is stored on the servers and then shipped to the workstations (mainly Dell 486 machines running Windows), where all the processing is done. "This architecture has to lend itself to massive data storage and very fast retrieval," said Pollard. The key to making it all work is to "design the workload to put the best parts of the processing and the best parts of the data storage on the appropriate platform on the network."

Systems are being replaced gradually. "We're working as quickly as possible to take the most decrepit, least functional [applications] and replace them with more modern software technology," Pollard explained. The same goes for hardware: "We have older pieces of equipment in this network that are no longer capable of handling the workload that we are assigning them, so we're rapidly rolling those out of our system and upgrading and replacing them.... Our strategy is to drop off older, weaker members of the network to maintain a continually growing level of processing capability at the workstation."

To date, a couple of small departmental applications have been moved to the new architecture. "The initial results have been promising, but we have a long way to go," Pollard said. The most significant work in progress involves rewriting the company's customer-information system, which runs on a Hitachi mainframe. "Our customer-service application is at the heart of our business, so it is important that we handle that migration well." Andersen Consulting is helping build the system, which Pollard said should be completed by September 1994 (see related story, Page 68). It will be at least a decade before all major applications are running on the new architecture, he added.

Getting buy-in for companywide standards administered by central IS was tough. "A CIO needs top-management support to get other departments to buy into the concept [of needing] only one set of computer technology," Pollard said. "It's hard for user departments to turn the fate of their organizations over to someone else." For instance, solving one department's problem in the quickest, least expensive way may not be the best solution. Central IS may see the problem as "an opportunity to expand the scope of that application and make it something that can be used across the corporation," Pollard said. "We're asking for the trust of the other departments that have very serious missions to take care of."

"PROPRIETARY PRODUCTS HAD gotten us into the situation we were in, and we wanted to get out."
–Ted Kimer

For Pollard, the true value of information technology lies in its ability to foster flexibility and responsiveness. "Deregulation has come to the airline industry, banking and trucking," he said. "We know it is only a matter of time before we are next, so we have to start thinking like a deregulated company and try to keep our costs as low as possible and our operation as efficient as we can."

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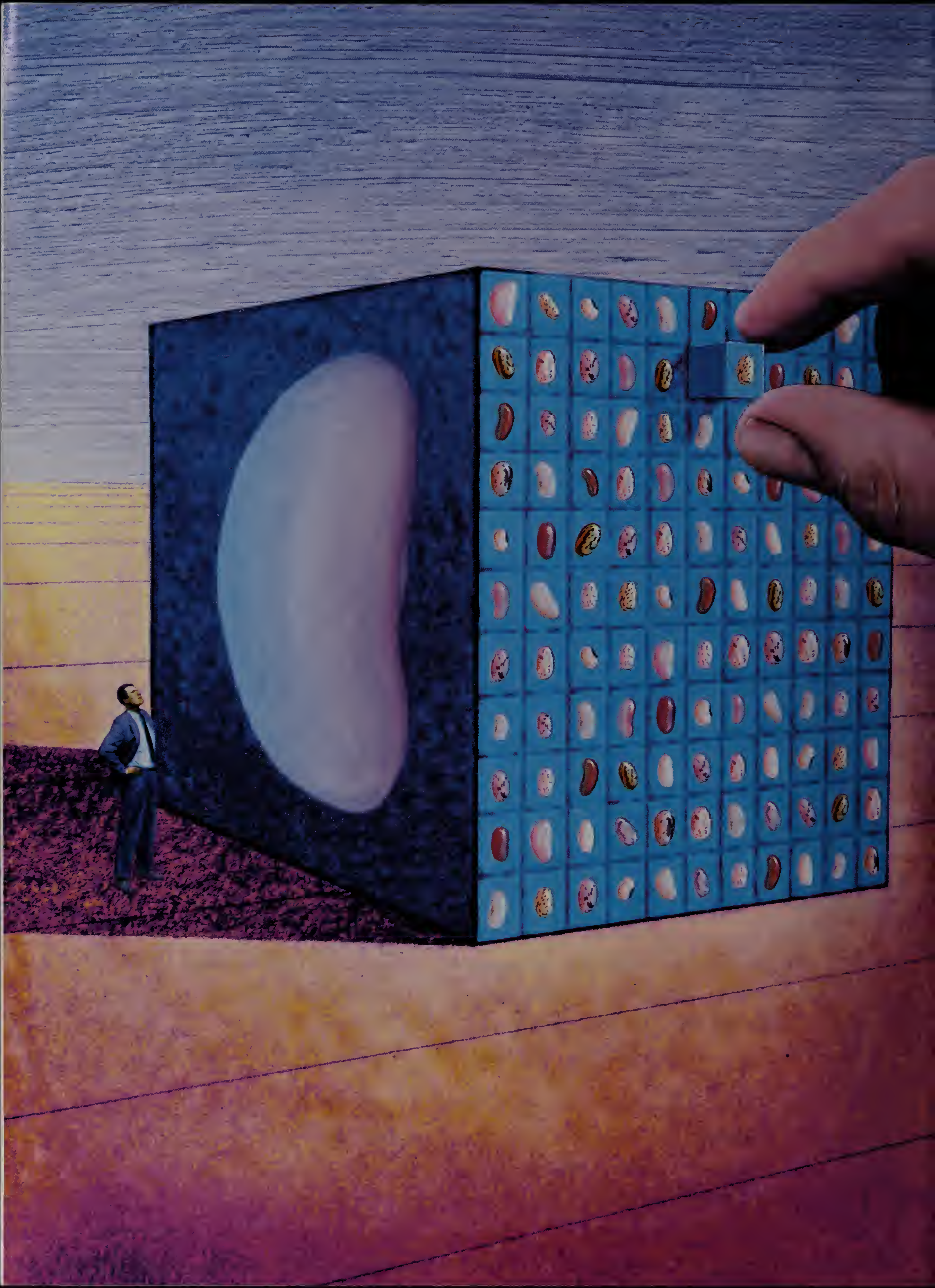

THE SUM OF ITS PARTS

New cost-reporting methods give senior managers a more accurate and informative financial picture by examining the trees as well as the forest

BY SCOTT WALLACE

Sometimes looking at the big picture just isn't enough. Increasingly, senior managers are realizing the importance of analyzing the numbers that add up to the bottom line and evaluating the activities and processes behind them. This need for improved information-gathering and reporting practices is evidenced by widespread interest in a variety of cost-containing and operations-improving methodologies. These approaches link process-level activities to enterprise-level results, enabling the development of more accurate and useful management information.

Traditionally, financial reports have rolled up data about activities to the corporate level, but this has proved problematical to managers of contemporary organizations. While summarizing operations data across the enterprise provides a solid foundation for assessing overall corporate performance, it obscures the performance of lesser entities, such as product families or cross-departmental teams.

"These systematic distortions cancel out at the macro-level and thus do not misrepresent income or assets on financial statements," noted H. Thomas Johnson, who holds the Retzlaff Chair in Quality Management at the Portland State University School of Business in Oregon. "But they give a misleading picture, for instance, of an individual product's margins. [That's] a fact many American and European manufacturers discovered in the 1970s and '80s when their marketing and product-selection strategies depressed earnings and, in several cases, generated a death spiral that led to the edge of bankruptcy."

Bala Balachandran, J.L. Kellogg distinguished professor of accounting, information systems and decision sciences at Northwestern University, in Evanston, Ill., characterizes the transition as a shift from reporting on the events of the past to managing the activities of the future. The foundation of the movement is accurate, detailed, timely information. "The so-called cost accountant today has to be called the cost manager," said Balachandran. "And he should be sitting not on the top floor but on the shop floor, and looking not at the bottom line but at the production line."

The goal, then, is to gain a more accurate view of the whole by emphasizing, rather than eclipsing, its parts. "For the first time, we are linking performance of the total company to individually controllable performance measures," said Balachandran. Several new financial-reporting methodologies further that goal by providing a continuum of process or activity awareness, from manageable micro-events to their unmanageable macro-summaries.

Activity-based costing is perhaps the best known of these new methodologies. ABC tracks resource utilization at the batch and process levels, linking activities directly with the resources they require or consume. Unlike traditional costing methods, ABC relies on empirical analysis to assign overhead, administrative and labor costs, rather than pooling and arbitrarily distributing those costs across products and functions.

Process-value analysis, a sister discipline to

ILLUSTRATION BY NISHI

ABC, is also gaining popularity. PVA requires looking at operations as a series of processes. The organization can then improve value-adding activities and eliminate or reduce non-value-adding processes.

Such approaches to assessing operational costs can have real payoffs. "These causal linkages tell you the resources you're giving up in order to deliver a product or service to a customer," said Robert Kaplan, professor of accounting at the Harvard Business School in Cambridge, Mass. "It turns out you can manage much more effectively at this level. You can make decisions about and take action on individual products or individual customers. These decisions, taken at the micro-organizational level, can leverage up to a big impact on organizational profitability."

Unlike many past innovations in financial accounting and reporting, pressure to explore and embrace these new disciplines comes less from CFOs than from senior management. "The reason ABC, PVA and other disciplines have become successful is that they are formulated in a way that is consistent with how operations people are thinking today in terms of activities and processes," said Peter Santori, a partner at Ernst & Young's Management Consulting Practice in Chicago.

One CFO and group vice president who has come to recognize the value of these new approaches is Bill Ausfahl, of The Clorox Co. in Oakland, Calif. Ausfahl just finished leading a high-level ABC exercise designed to give employees a new perspective on operations and gain a better handle on administrative costs. "We had each department go through an activity-based costing analysis, not in great detail but rather at the 10,000-foot level," said Ausfahl.

Applying ABC disciplines to administrative operations at the enterprise level is somewhat unusual. More commonly, ABC focuses on manufacturing costs. That's where Clorox's involvement began, almost three years ago, when Manager of Financial Systems Implementations Hal Thilmony started developing a PC-based cost-analysis system that operates in parallel with the company's mainframe financial-reporting system.

Thilmony's Activity-Based Cost Analysis and Reporting (ABCAR) system converts manufacturing-cost data into information that is useful to management. "The system provides insight into the relative value of work being performed and offers a basis for trending or benchmarking the cost of activities," said Thilmony, who reports to Ausfahl. "It also serves as an 'as-is' model for assessing processing-reengineering opportunities and provides a format for capturing and evaluating the cost of quality."

Specifically, ABCAR helps the company identify the product mix that generates optimal profit from available capacity. And it helps management assess more accurately the demands placed on the company's manufacturing resources by new-product introductions. "We also look at activity information to ferret out low-value work," said Thilmony. "We can then create corrective-action teams and initiate process reengineering."

Brad Akright, a cost systems analyst at Kansas City, Mo.-based Goldblatt Tool, is also concerned with maximizing the accuracy and usefulness of manufacturing-cost data. For the past two and a half years, he has been working on a special project: implementing and refining a new process-value analysis and activity-based costing system.

"We had some market research done several years ago, and one of the things that we found was that our products were perceived by customers as expensive," Akright said. After some internal scrutiny, he and his colleagues concluded that product costs weren't as accurate as they could be.

Goldblatt, a recently acquired division of Stanley Tools, had invested considerable resources in its mature, factory-floor-based manufacturing-control system and was largely pleased with its operation. Rather than upgrade that implementation to support new analyses and reports, the company—like Clorox—chose to develop its costing system on a stand-alone PC.

The outcome was favorable. After using the system for several quarters, manufacturing, marketing and sales staff have determined that the product information it provides more accurately reflects true manufacturing and support costs. "We're pleased with the system," said Controller Michael Graikoski. "It's proved the value of activity costing."

While Clorox and Goldblatt are manufacturing companies, the type of environment where ABC and performance-improvement practices were first employed, these techniques are equally valuable in service organi-

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▶ **ACTIVITY-BASED COSTING:** ABC disciplines directly link activities with the resources they require or consume. ABC was initially applied in manufacturing environments to capture variations in individual products' demand on shared resources. Today ABC tracks resource utilization at the batch and process levels and is being used in service environments as well.

▶ **PROCESS-VALUE ANALYSIS:** PVA disciplines involve the identification of major organizational processes and the activities and sub-activities of which they are composed. Organizations analyze internal processes to identify their root causes—why the activities are undertaken. Processes are classified according to whether they add value; then their costs are determined. The enterprise can then assess the importance of each activity and eliminate or reduce non-value-adding processes.

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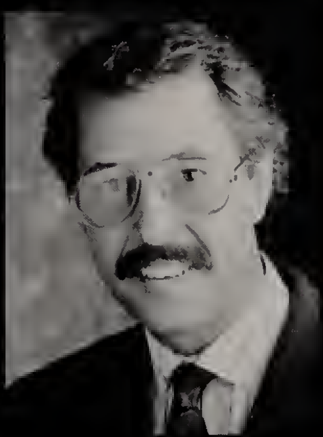

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The Problem with Parallel

PC-based financial-reporting systems can produce great results—but what happens when the mainframe disagrees?

The power of the PC platform—and the relative ease and speed with which applications can be developed—have encouraged the adoption by many corporations of activity- and process-based analytics. "We can now access the detailed, underlying data from the organization's different information bases and bring it all together and manage it with a PC," said Robert Kaplan, professor of accounting at the Harvard Business School in Cambridge, Mass.

Providing information that enables learning and improvement in a timely manner is critical. "If your organization is taking a total-quality approach, you need to provide feedback on a nearly real-time basis," said Kaplan. "Operators may well undertake experiments in an effort to make things better, and it doesn't do any good to get back to them [with a month's worth of information] at the end of the month."

But what happens when a company has two independent financial-reporting systems—one on the mainframe and one on a PC—and those systems report different results? The current generation of process-oriented systems are implemented in parallel, with one system for external reporting and one for internal use. "Ninety percent of the companies using activity-based analysis today have two systems, one mainframe and one PC," said Bala Balachandran, J.L. Kellogg distinguished professor of accounting, information systems and decision sciences at Northwestern University, in Evanston, Ill. "I say, if somebody has two watches, he does not know the time.

"If a company wants to do a pilot study with a PC to gain experience and understand how to develop the system, fine," Balachandran went on. "But the system should be integrated with the rest of the company or it will eventually fail." *–S. Wallace*

zations. "If you look at where ABC is being used in manufacturing today," said Kaplan, "it's not being applied to products and materials but to the service functions: scheduling, purchasing and designing. There's really no difference applying ABC to all types of service organizations."

Northwestern's Balachandran concurs. "The only difference between manufacturing and service is that the service industry doesn't have a finished-goods inventory," he said. "If a manufacturer has a finished product and it is not sold in this period, it can be inventoried and sold in the next period. In a service enterprise such as an airline, however, if there is a plane that takes off 60 percent filled, the remaining 40 percent of the seats cannot be [regarded as inventory]."

Like many other companies, Goldblatt gave the finance department, rather than IS, responsibility for making the new costing system work. While many CFOs feel this approach is in keeping with the accountability and control they are charged with maintaining, the real motivation for finance to manage and pay for the development of these systems is usually a bit more pragmatic. "Unfortunately," said Ernst & Young's Santori, "in many companies, the IT guys wear a tag that says, 'This is going to take forever.' "

Whatever CFOs' reservations about IS, they cannot leave that organization totally out of the equation if they hope to provide effective process-oriented financial systems. According to Balachandran, there must be unprecedented coordination among the manufacturing, engineering, marketing, finance and IS departments.

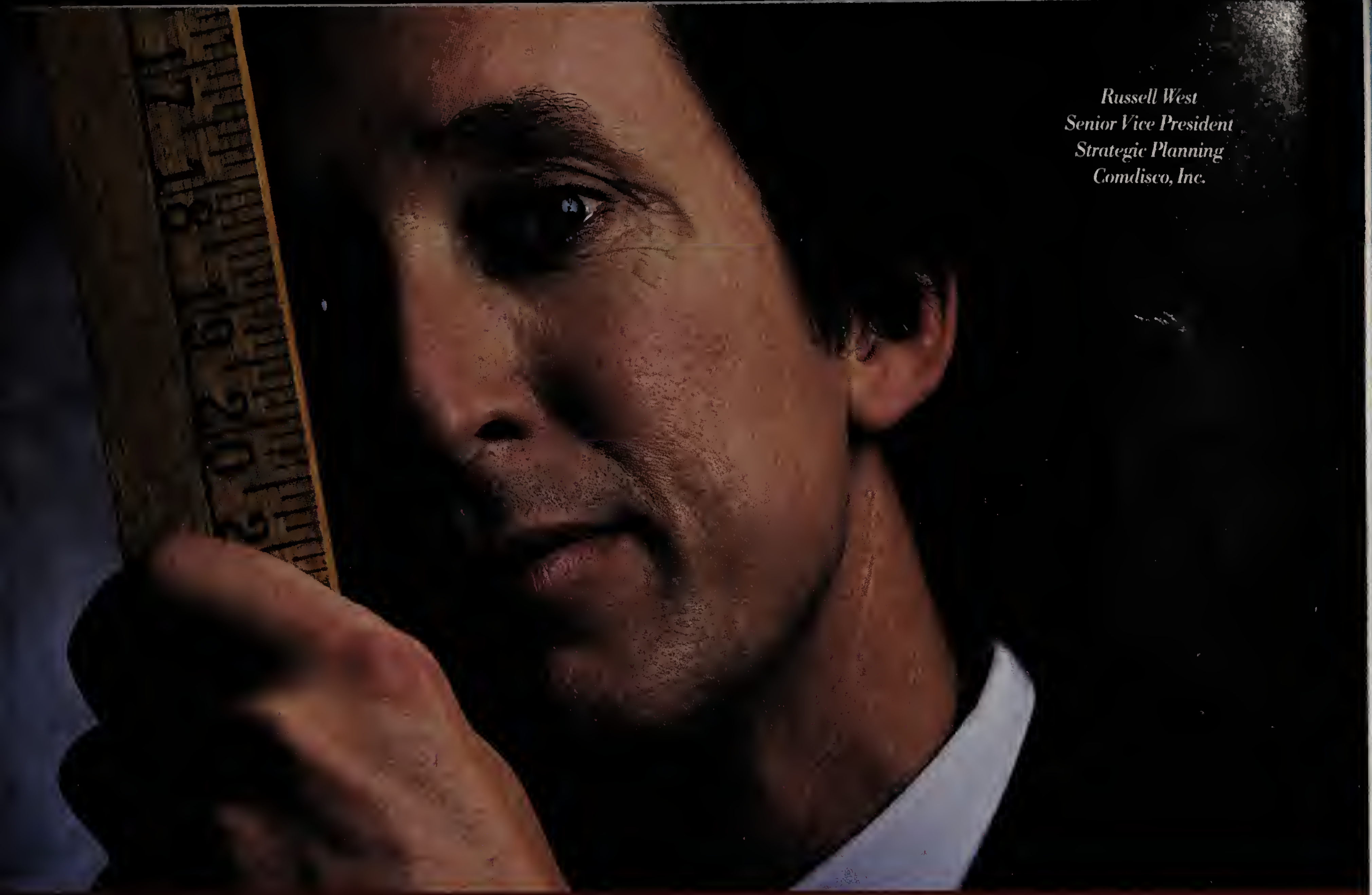
At MAPCO, for example, a Fortune 200 provider of coal, petroleum and natural-gas products headquartered in Tulsa, Okla., CIO and Vice President of Information Systems John Framel is collaborating with the CFO to develop new financial-reporting and accounting systems. "We're working closely together, reviewing our systems strategy and taking a whole new look at our financial reporting, including activity-based costing and all the rest," he said.

Framel, who has held senior financial positions in his career, is well-suited to this assignment. "Most companies seem to be looking at financial-systems reengineering from the standpoint of vertical processes like accounts receivable and accounts payable," he said. "We encourage our people to look across these vertical processes at what we call meta-processes."

Finding the linkages between processes and the synergy that these linkages promote can have bottom-line benefits. But this kind of activity-based analysis is usually complex and time-consuming. At Clorox, for example, "we're very early in the analysis, but my guess is that it's a process we'll continue for a number of months," said Ausfahl.

The fact that ABC exercises can take a long time doesn't mean they take a long time to pay off. When Clorox applied ABC analysis to its employee communications department, it quickly discovered that "by combining and changing the publishing frequency of some of our employee publications, we can not only improve quality but also cut costs," said Ausfahl. "We've already been able to skim some cream."

Scott Wallace is an independent computer-industry analyst based in Warwick, Mass.



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Long-Distance LANs

Organizations can now provide LAN access to users working beyond the reach of the extended corporate network. With foresight, CIOs can meet user requirements while keeping costs down and maintaining network integrity and security.

BY LUCIE JUNEAU

Providing remote users with local area network services is becoming a high priority for many IS organizations as workers increasingly take to the road with portable Macs and PCs. Remote-connectivity options aren't hard to find, but each solution involves trade-offs. And extending a network's reach beyond the traditional office can open a Pandora's box of networking headaches.

While many corporations with geographically dispersed operations have succeeded in linking LANs at branch offices to networks at corporate headquarters, not many have systematically offered LAN access to users working beyond the reach of the extended corporate network. Such users typically include telecommuters (employees working at home), employees who travel frequently (many now equipped with notebook PCs) and workers at remote offices that aren't serviced by LAN internetworking solutions such as T1 lines. Provided with remote-access capabilities linking them to corporate E-mail systems, databases or other network-based applications, these users could potentially work much more productively.

Most companies that provide remote users with dial-up network services do so via public, analog telephone lines. Although in years to come users may dial into their networks via digital services such as ISDN, the use of standard dial-up connections has grown more palatable as modem technology has improved. Data-compression techniques are boosting modem speeds, improving performance and thus reducing the cost of transmitting data. And error-checking techniques make today's modems much more reliable than their predecessors. Furthermore, modems are cheaper than they used to be: Today, a 9600 baud modem can be purchased for as little as $200 or as much as $1,000, depending on whether it offers, for example, cellular capabilities or callback security.

Offering dial-up access to mainframe and minicomputer systems is relatively easy. Equipped with terminal emulation and communications software, a remote PC user with a modem can dial into the host computer and upload or download files, or work as though connected to the host right at the office. But connecting to the LAN is a bit trickier. Depending on the number of remote users and their needs, managing PC LAN access effectively can involve a confusing array of hardware and software solutions. Yet the need to provide remote LAN access is becoming more critical as IS organizations continue to move databases and applications down from their mainframe systems to servers on LANs.

The challenge for IS is to meet remote LAN access requirements while keeping costs down and maintaining network integrity and security. Initial set-up costs—including the cost of installing additional phone lines and purchasing the hardware and software required to run the remote-access solution—are just the beginning. It is important to arrive

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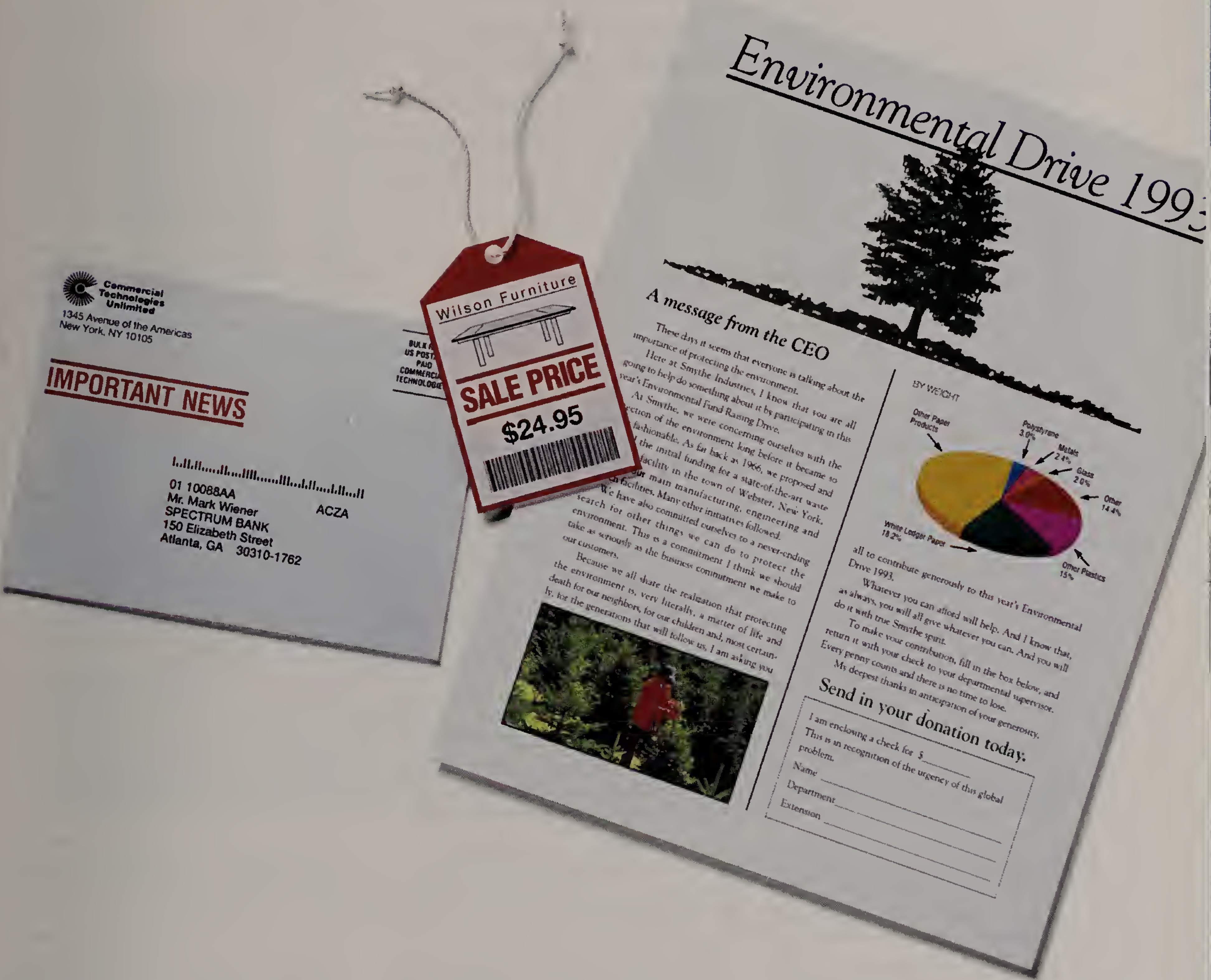

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at a solution that will be relatively easy to administer—requiring minimal IS support—and that will make the most efficient use of phone lines and equipment. Managers must also consider how the solution they choose today will accommodate the organization's needs in years to come.

Organizations whose remote users require access to only a single network application—E-mail, for example—can often accommodate them quite easily. Some vendors offer special versions of their standard applications for remote use. For example, Lotus Development Corp. offers DOS and Macintosh users remote versions of its cc:Mail. (Remote versions of cc:Mail for OS/2 and Windows users are under development.) With the help of a modem and the remote version of the E-mail software, remote users can communicate with users back at the office. Lotus's Notes product can also be used remotely.

Of course, most remote users would like to be able to access multiple network applications. There are two primary methods of doing so. A remote user can gain access to LAN services by dialing into an on-site PC via modem. Using remote-control software such as Symantec's pcAnywhere or Microcom's Carbon Copy—installed on both the remote and office machines—the user can control the office PC remotely. In a remote-control arrangement, the user's remote equipment doesn't process data; it merely sends keystrokes to and receives screen information from a PC connected directly to the LAN. Today, the vast majority of companies that provide LAN access to their remote users—about 70 percent, according to a September 1992 study by Forrester Research Inc.—do so via remote control.

To achieve greater economy, organizations with more than a few remote-control users can make use of asynchronous communications servers such as Cubix's System 1000, J&L Information Systems' ChatterBox and Multi-Tech Systems' MultiComAsync Gateway. These hardware units house multiple modems and PC processor boards. With Cubix's server, for example, one governing processor in the unit controls the entire rack of modems and processors and acts as a router to get information to and from the network. When the Cubix server is bundled with Telebit's Asynchronous Communications Server (ACS) software in a package called LCS/ACS, which includes pcAnywhere remote-control software, it allows multiple users to dial in and access the LAN at the same time and eliminates the need to provide each dial-in user with a standard PC.

It is important to arrive at a solution that will be relatively easy to administer—requiring minimal IS support—and that will make the most efficient use of phone lines and equipment.

Other products (such as Alloy Computer Products' MultiWare, which uses a special multiplexing version of Novell's IPX software, developed by Novell for its own Access Server) implement remote control by using multitasking operating systems that allow a single PC to accommodate several simultaneous sessions. Using a single processor to accommodate multiple users may cost less than providing one processor per user. However, the throughput achieved with the multitasking product may not be as great as it would be with a multiprocessor server.

The second method of accessing multiple LAN applications involves the user's remote PC as a real participant on the LAN. This arrangement is referred to as remote-node connectivity or LAN extension, because the LAN protocol is in effect extended to the remote user over the phone line via a bridge or router. For example, Macintosh or PowerBook notebook users can turn their remote machines into nodes on their AppleTalk LANs using products such as Cayman Systems Inc.'s GatorLink or Shiva Corp.'s LanRover/E for AppleTalk Remote Access, both of which implement Apple Computer's AppleTalk Remote Access (ARA) protocol. Another version of the LanRover product, LanRover/E for NetWare, provides remote access to NetWare LANs. Telebit's NetBlazer router, which implements the point-to-point protocol (PPP), can provide remote access to any LAN running the AppleTalk, IPX or IP protocols. (PPP, a protocol developed by the Internet Engineering Task Force, provides a standard method for transporting multiple protocols over a single link.) Digital Communications Associates Inc. offers a bridging solution called Remote LAN Node (RLN), which allows remote users to run multiple protocols simultaneously.

Organizations run a security risk whenever they transmit sensitive data over public phone lines or open up their LANs to off-site users. (The risk may be greater when the remote-node option is selected, because more data is moving between the LAN and the remote machine.) For that reason, many LAN-access products now include built-in password security, dial-back capabilities and other security measures. The most secure systems include the use of encryption. Telebit's ACS, for example, includes a user-authentication option. Each authorized user is assigned a credit-card-size device that must be used to provide an encrypted string of characters to the server each time the user accesses the network from a remote location. Cayman offers a similar system requiring a secure ID card.

There are advantages and drawbacks to both primary methods of providing remote LAN access. The remote-control option allows the IS manager to equip a remote user with a relatively inexpensive terminal rather than a PC, because the remote machine doesn't need to process any information. However, working remotely can be cumbersome—and costly, if it requires long-distance calls—and most users prefer to process data locally. File-transfer capabilities enable users to move files to their re-

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mote machines and work from there, minimizing the use of phone lines and cutting response times.

Until recently, remote control hasn't been good for Windows users, because sending Windows screens between the local PC and the remote user's machine can take quite a while. However, remote-control software vendors have recently begun to resolve this problem by boosting file-transfer speeds. For example, a new copy of Microcom's remote-control software, Carbon Copy for Windows 2.0, reportedly performs quite well when used with modems providing 9600 bps or better.

Some IS organizations prefer the remote-node solution because it is less confusing for the average user, who is actually doing what he or she appears to be doing—i.e., working from his or her own remote machine. If the user transfers files off of a network server, for instance, they will in fact be moved to the remote system and not to an on-site PC, as they would be in a remote-control situation. However, it is the availability of cheap, high-speed modems that has really made the use of remote-node technology feasible, according to Jeffrey Held, a partner in the network strategies practice at Ernst & Young in Vienna, Va. Even using a high-speed modem, however, transferring very large files across phone lines just isn't practical. That is why the remote-node option works best when most of the applications that the user needs are located on the remote machine, or when only relatively small files need to be transferred.

Use of remote-node technology will grow as more organizations implement client/server computing, because a remote user working in a client/server environment typically won't need to send large amounts of data across the phone lines. (For example, when a remote user on a client/server LAN accesses a database on a LAN server, it remains on the server rather than being transferred to the remote machine, as it would be typically.) IS managers interested in providing a future pathway to client/server applications will therefore select the remote-node option, says Brad Baldwin, an analyst with the Gartner Group Inc.'s research center in Santa Clara, Calif.

> *The remote-control option allows the IS manager to equip a remote user with a relatively inexpensive terminal rather than a PC, because the remote machine doesn't need to process any information.*

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Because the two solutions excel under different circumstances, some organizations may want to use remote control in some situations and the remote-node solution in others. Telebit's NetBlazer remote-node solution can be purchased with a remote-control option. When a remote-node user tries to transfer a lot of data over the phone line, the product warns that the transfer may take a long time and asks if the user would like to switch into remote-control mode. (Of course, to make use of the remote-control option, the user must have an on-site PC.)

Organizations with many remote users pursuing similar, mission-critical activities might consider a turnkey solution. XcelleNet Inc.'s RemoteWare family of software tools are designed to improve the flow of information between remote users and corporate headquarters. For example, specialty retail chains typically need to send sales information to their home offices at the end of each business day. Using XcelleNet's RemoteWare Communications Management System, users could transmit their data using standard dial-up lines.

Remote users such as these don't usually need full access to LAN services but do require access to specific applications. XcelleNet's software helps manage access to these applications and track the flow of information. It also manages the integration of incoming data with central-site systems. The RemoteWare software runs under the OS/2 operating system on any 386 or 486 PC server located at the central site.

Companies interested in extending their LANs to users who are a little less remote—perhaps working on-site but in offices or settings where wiring is impractical—can now do so via wireless data-communications products. For example, Proxim Inc.'s RangeLAN uses spread-spectrum radio technology to extend LAN services to nodes within a range of 800 feet, through walls and other obstructions (see "FYI," *CIO*, April 15, 1993). The product is available for standard PCs as well as notebooks. Traveling professionals might use RangeLAN with their notebooks to transfer files to or from a LAN before and after trips, for example.

IS managers providing remote LAN access through the use of dial-in modems will want to consider investing in modem-management packages once dial-in traffic reaches a certain volume, according to Ernst & Young's Held. An organization with 30 or more inbound modems would clearly find the expense of such a system justified, he said. The first rule of remote-access management, after all, should be to make sure that users can get through to the network when they need to.

Lucie Juneau is a freelance writer based in Salem, Mass.

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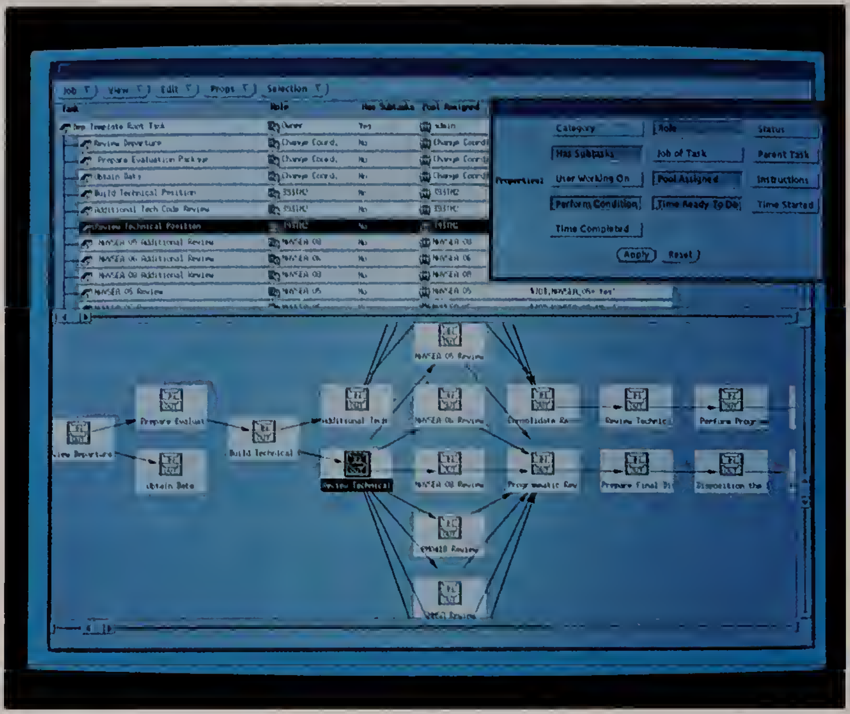


Task Master

Workflow management tools typically automate the movement of data throughout an organization with the goal of streamlining the work process and enhancing productivity. InConcert by XSoft, a division of Xerox Corp., can be programmed to automatically prompt and track all tasks in a given workflow process, actively locating the required business documents and software tools for each project step and delivering them at the right time to the users who need them. These business documents or tools can take many forms: spreadsheets, images, graphics, text.

The product's graphical, object-oriented interface allows end users to design, modify and monitor the automated workflow process. InConcert is intended for use in distributed computing environments; its base configuration supports one Unix server and 10 client stations for a price of $21,000. For details, contact XSoft in Palo Alto, Calif., at 800 343-9366.

Checking for Bad Checks

Check fraud costs retailers an estimated $10 billion a year. A new offering from Shared Financial Systems lets companies develop their own in-house network to access check-cashing histories and improve collection.

Check Management's acceptance feature lets retailers verify checks on both a positive basis, by establishing an online electronic-check program, and on an exception basis. Retailers can also customize check-authorization rules and limits—such as check-cashing and cash-back limits—using such broad-based criteria as type of check, customer information, identification or account numbers and store location.

A database tracks returned checks through the collection process and updates their status online. Because the data is available online to all store locations, the system prevents check runners from successfully moving from store to store and gives stores the flexibility to accept checks from customers who have paid their returned-check fines.

The system interfaces with proprietary and national check-cashing databases, from ETC SCAN, Comdata and other companies, to share check-history information among retailers. For more information, call 214 233-8356.

Copyright Cop

When it comes to many areas of the law, ignorance is no excuse. Copyright infringement is no exception. Now that the Software Protection Act of 1992 has made such infringement a federal offense, keeping track of software assets is more important than ever.

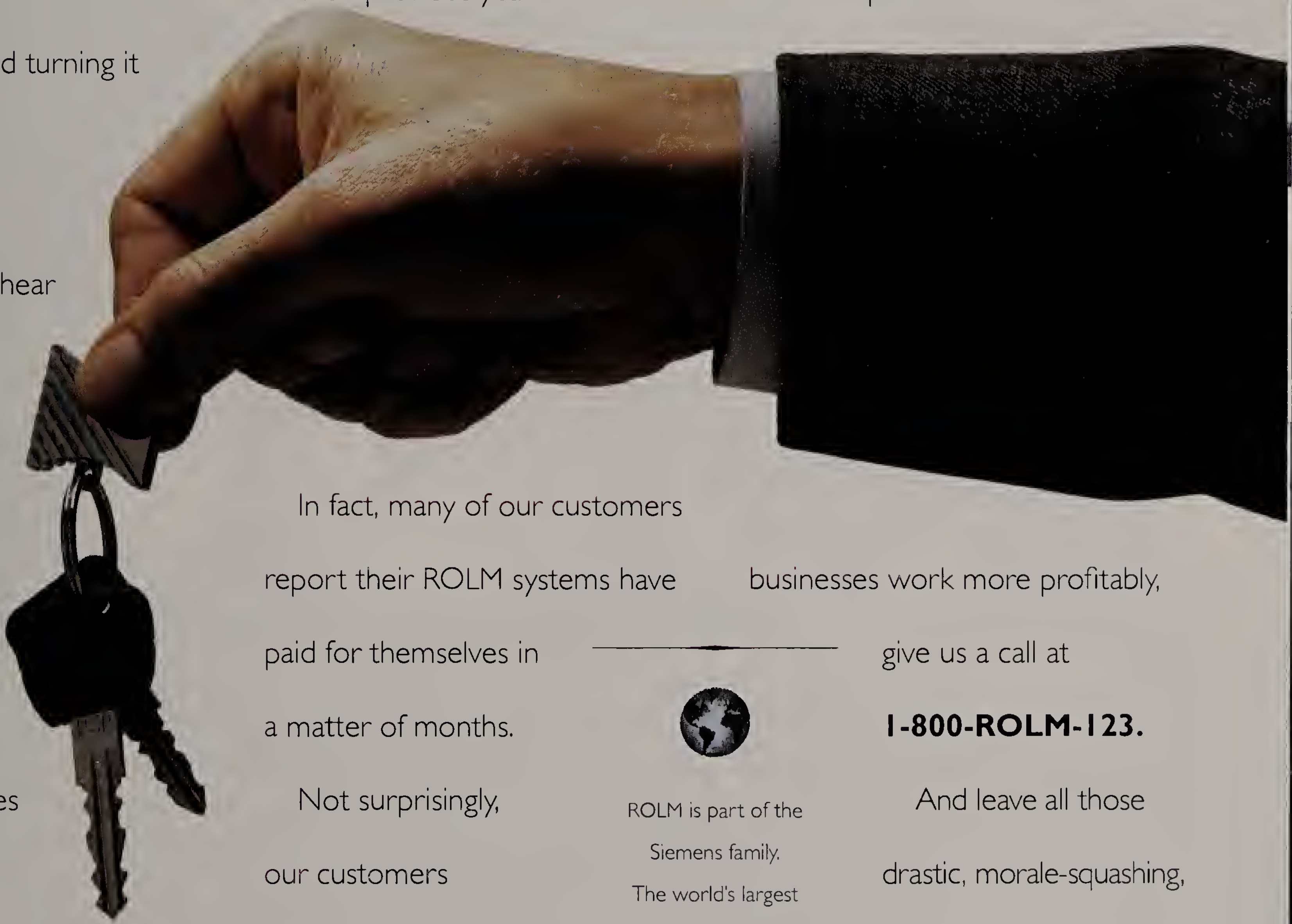
CopyAlert, from PC Integrity Inc. of Princeton, N.J., helps corporate IS and auditing departments guarantee the use of only authorized software on networked, standalone and portable PCs. The product verifies that all executables present on a PC's disk have been registered for use on that machine. If unregistered software is detected, CopyAlert suspends operation of the PC and notifies the user. Users contact management, which can provide either a single-use password that automatically registers the detected files and expires, or a temporary password that allows use of the PC and the removal of the unauthorized software.

Price depends on the number of licenses required, from $49.50 per license for up to 25 PCs to $10.20 per license for 5,000 PCs. For more information, call 800 742-7722.

PC Portrait Gallery

Pictures of the spouse and kids can be scanned into your desktop computer much more easily, and more cheaply, thanks to a new product from Nikon Electronic Imaging, a unit of Nikon Inc. in Melville, N.Y. Coolscan, a 35mm film scanner, captures 24 bits per pixel in a single-pass scan of both color and black-and-white negatives or transparencies, and yields a maximum resolution of 2700 dpi. (The product earns its name because the heat it generates is so low—in techie parlance, it's the LS-10.)

Coolscan is available in both external and internal versions. The internal version is small enough to fit into a half-height disk-drive bay on an Apple Macintosh or IBM/PC or compatible computer. The external version will fit comfortably on a desktop—it measures just 6 inches wide by 13 inches long, is 2 inches high, and weighs 4.2 pounds. In addition to running on Macs (Series II) and personal computers, Coolscan is compatible with Windows 3.1, Windows NT, Unix, NeXT Color Cube, Silicon Graphics IRIS workstations and Sun SparcStations. Prices start at $2,195 for the internal version, $2,495 for the external unit. For more information, call 516 547-4200.



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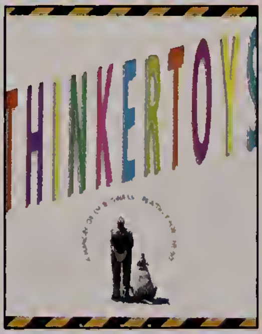
OFF THE SHELF

THINKERTOYS
A Handbook of Business Creativity for the 90s
By Michael Michalko
Ten Speed Press (Berkeley, Calif.), 1991
335 pages, $17.95 (paperback)



Do you feel as though you're in a mental rut? Is the vision thing as flat as a stretch of Nevada highway? Are your teams churning out stale, predictable, unexciting ideas? Then try a few of the mental shake-up games from *Thinkertoys*, a guidebook to remedies for the mental blahs.

Creativity consultant Michael Michalko believes that managers and employees have trouble dreaming up new ideas because they sit back and wait for them to occur, like sudden illuminations from another world. It doesn't work that way, Michalko says: Tapping into the creative requires flexing one's mental muscles. Toward that end, *Thinkertoys* is a compilation of hands-on mental exercises aimed at sparking creativity.

At first glance, it is tough to take this book seriously. After all, the author endorses some pretty far-out methods, such as personifying the unconscious (and then carrying on a dialogue with it) and reading the Egyptian *Book of the Dead*. But among the flakier recommendations are many good, practical suggestions for pumping up the creative juices.

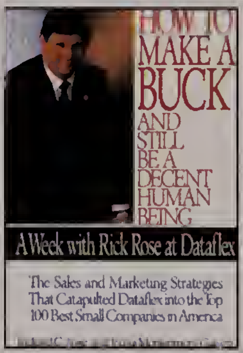
The book is divided into four sections, each offering techniques to prompt different kinds of creative thinking. The first offers a collection of activities to help managers look at information in new ways, to shake up the familiar. These include reversing assumptions and mind mapping, a technique to render processes and complex ideas in visual terms. Michalko also suggests ways to construct grids or matrices to get at new concepts.

But idea conjurers may also hope to draft the unconscious and put it to work on problems. This is the business of the book's second section. Dreams, analogies and images are routes to the "intuitive skills," Michalko claims. For instance, that recurring dream, if analyzed, may suggest a solution to a vexing business obstacle.

In the book's final two sections, Michalko offers advice for teams interested in improving their brainstorming sessions and describes a Japanese group-creativity method called "Rice Storm," wherein solutions are plucked from the "essences" of facts. He also discusses techniques for ordering and prioritizing ideas.

Thinkertoys has its loopy moments, but on balance it is a uniquely practical guide to creative thinking. While it may not be for everyone, the book may prove useful to managers in times when the ideas aren't raining down like pennies from heaven.

HOW TO MAKE A BUCK AND STILL BE A DECENT HUMAN BEING
A Week with Rick Rose at Dataflex
By Richard C. Rose and Echo Montgomery Garrett
HarperBusiness (New York), 1992
246 pages, $20.00 (hardcover)


HOW TO MAKE A BUCK AND STILL BE A DECENT HUMAN BEING
A Week with Rick Rose at Dataflex
The Sales and Marketing Strategies That Catapulted Dataflex into the Top 100 Best Small Companies in America

Rick Rose does business based on three principles: that people are entitled to an excellent working environment; that customers deserve to be treated with sincerity and integrity; and that Dataflex, the Edison, N.J., computer reseller of which Rose is CEO, can and should strive to be the best company it can be. Yes, this is one of those myriad inspirational profiles of relationship-oriented companies that litter the shelves of bookstore business sections, expounding the values of creating teams, implementing TQM, calling employees associates, having unassigned parking spaces and caring about people. The information you'll find in here might not be new, but *How to Make a Buck and Still Be a Decent Human Being* has a genuine quality that distinguishes it from many of its brethren.

In the eight years since Rose joined Dataflex, he has been instrumental in rescuing it from the brink of bankruptcy and transforming it into one of the fastest-growing companies in the country. The culture that has emerged under his command—particularly within the sales force—demands initiative, responsibility and loyalty from associates and empowers them to grow and thrive.

Rose's regimen of daily, early-morning sales meetings is designed to build teamwork, encourage participation and teach employees to evaluate themselves and others honestly. Thus, the company weeds out the weak, the unproductive, the uncommitted and the unethical. Is Rose tough? Yes. But he seems driven as much by his strong personal ethics as by his will to achieve. He understands that employees will only be committed to a company that's committed to them. And in instance after instance, when it comes down to choosing between the company's principles and making or saving money, principle wins out.

How to Make a Buck is a bit too heavy on details about the upbringing and personal aspirations of practically every Dataflex employee, and at times, the authors' attempts to paint the picture of an open, loving atmosphere seem forced. We not only follow Rose around the office, we accompany him into the men's room. We even witness him mouthing, "I love you," to a sales associate during an emotional meeting.

Ultimately, however, the book effectively conveys the challenging, growth-fostering culture Rose has worked so hard to create. Rose pushes his employees to excel, to own their own successes, and to create personal visions of greatness. He has a lot to teach other CEOs about fostering the trust and openness that allows employees to follow their vision for the company.

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